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Saving Space in a Steel Foundry

A Photo-Story of the Pettibone Mulliken Plant

ECONOMY in space, increased output and further reduction in labor became important aims of the Pettibone Mulliken Co., Chicago, when it developed an extensive jobbing trade in steel castings in addition to its original output of railroad specialties. Under the pressure of increased demands on its capacity, its steel foundry, which consisted of two 65-ft. bays, 243 ft. long, was extended 238 ft., making a total length of 481 ft. Compact and convenient location of sand storage, sand handling equipment and core room was an important consideration, and it was decided to set aside for those departments the northwest corner of the plant.

Approximately 45 ft. of the western end of the north bay, adjacent to a railroad track which crosses that extremity of the building, was set aside for storage bins for new sand, coke for core ovens, clay, and outgoing rubbish. The next 70 ft. of the bay was allotted to a core room and sand mixing equipment. The space, however, was too small for both departments, creating a problem which was finally solved by superimposing one above the other.

A mezzanine floor, 17 ft. 6 in. above the main foundry level, now carries the small work core room. On this elevation also are four core ovens for small cores, which are directly above three core ovens

(on the main floor) used for larger cores. Underneath the small work core room is the equipment for cleaning, sifting and mixing sand. Adjacent to the sand handling department and connected with it by conveyors is a shakeout floor.

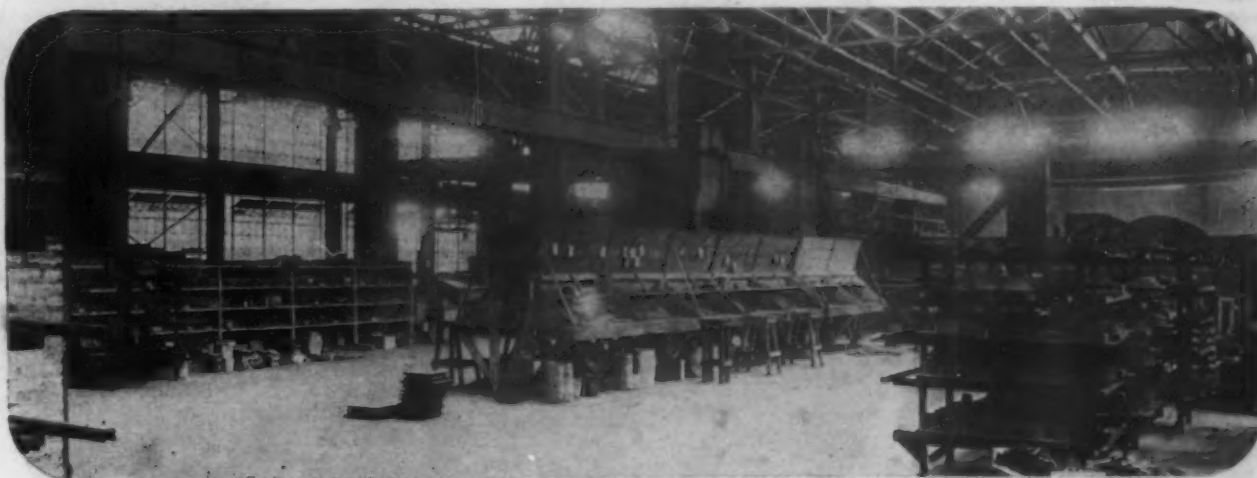
In addition to the core work it is necessary in the Pettibone Mulliken plant to dry many molds of considerable size. For that purpose a battery of five mold drying ovens was located in the middle of the foundry.

Conservation of space was also employed to advantage in the melting department. Two electric furnaces are located on an elevated plat-

form, with transformer equipment underneath.

The general plans for the improvements were devised by the H. M. Lane Co., Detroit. The ovens for both cores and molds were furnished by Holcroft & Co., Detroit. The sand conveying machinery was built by the Link-Belt Co., Chicago, and the electric furnaces by the American Bridge Co.

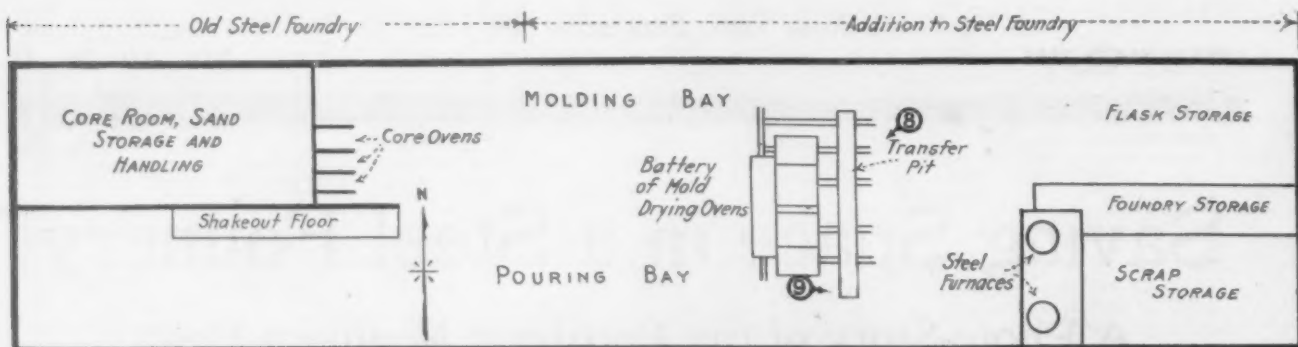
Camera views, taken from points indicated on the accompanying plan drawings, permit visualization of unusual improvements, which embrace a core room placed above the sand mixing department, compact arrangement for sand storage, sand handling and shaking out, and convenient placing of mold drying ovens. Sand sifting and cleaning equipment is featured by a large rotating screen which separates manganese steel from soft steel scrap.



I—The small work core room is located on a floor 17 ft. 6 in. above the main foundry level. In the rear are sand bins and the heads of various elevators in connection with the sand delivering system. The core-makers' benches in the middle of the room are supplied with sand by traveling crane; the cores are dried on steel racks, which, in turn, are handled by lift trucks. Some of the racks are visible at the right.

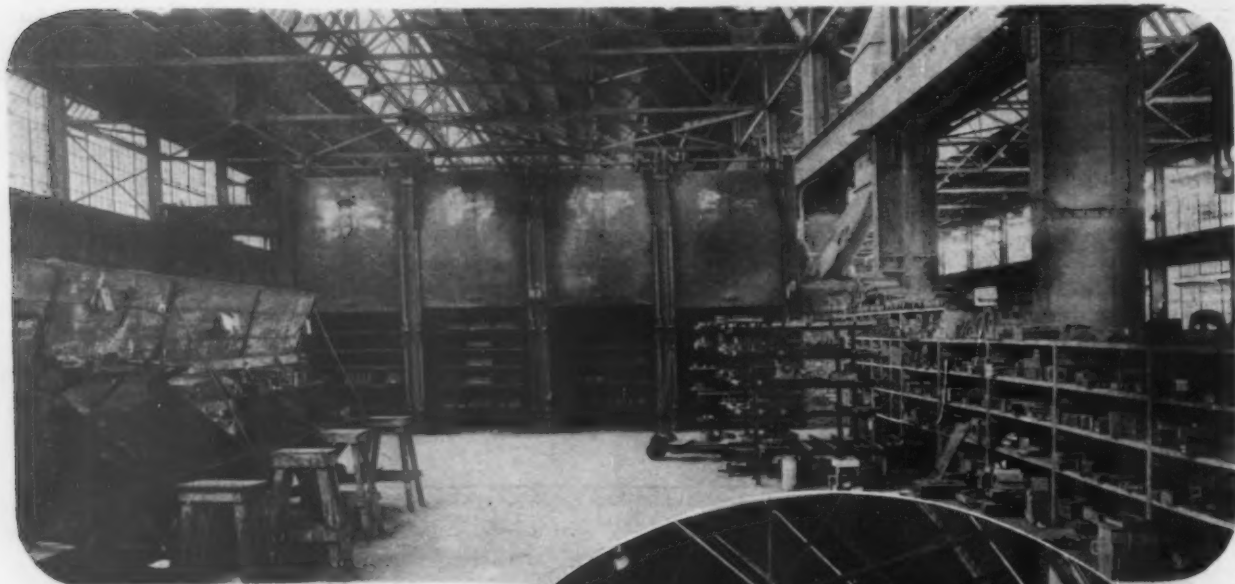
Photo-Story

PLAN view of entire foundry showing location of core room and sand handling department, mold drying ovens and melting equipment. The numbered arrows show where two photographs (with corresponding numbers) were taken.

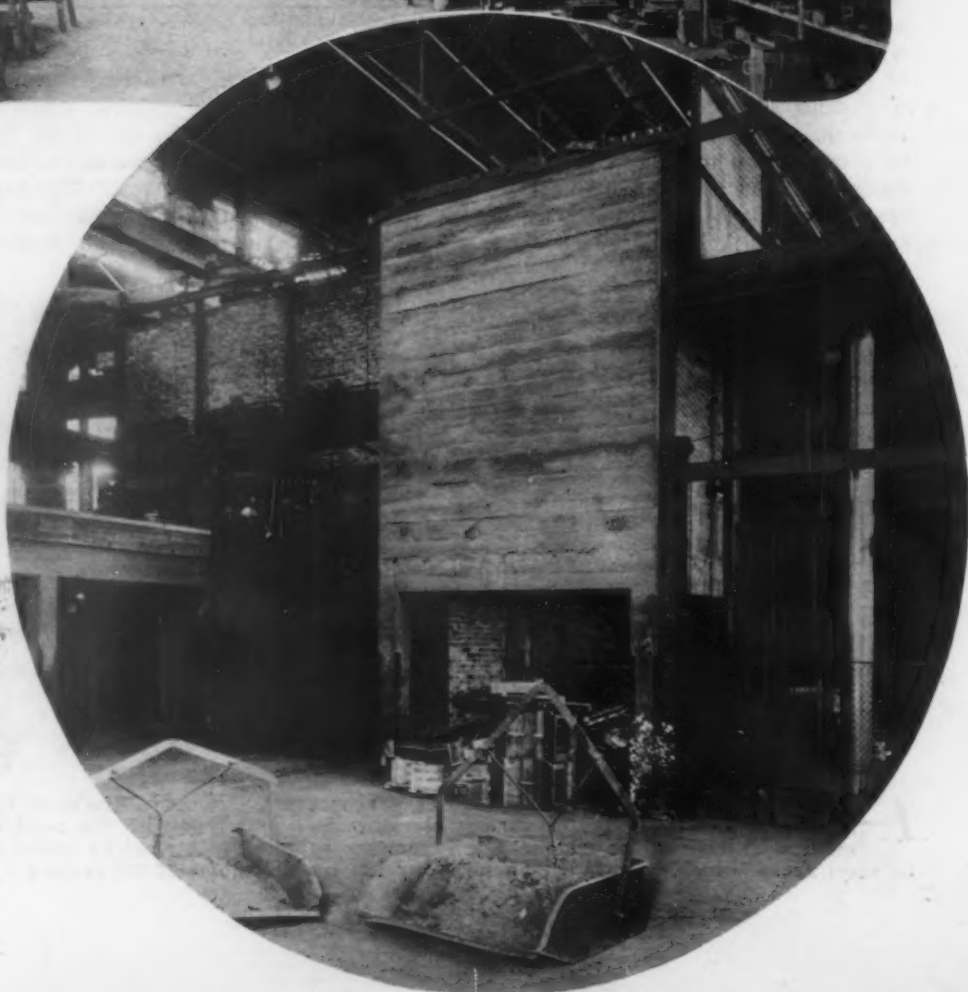


2— A view of the core room (below) looking toward the ovens. These are of the auxiliary air-forced blast type and are fired with coke. To save space, a battery of ovens for heavy cores was placed underneath the upper battery. The batteries are built entirely separate, each supported by its own concrete work, but

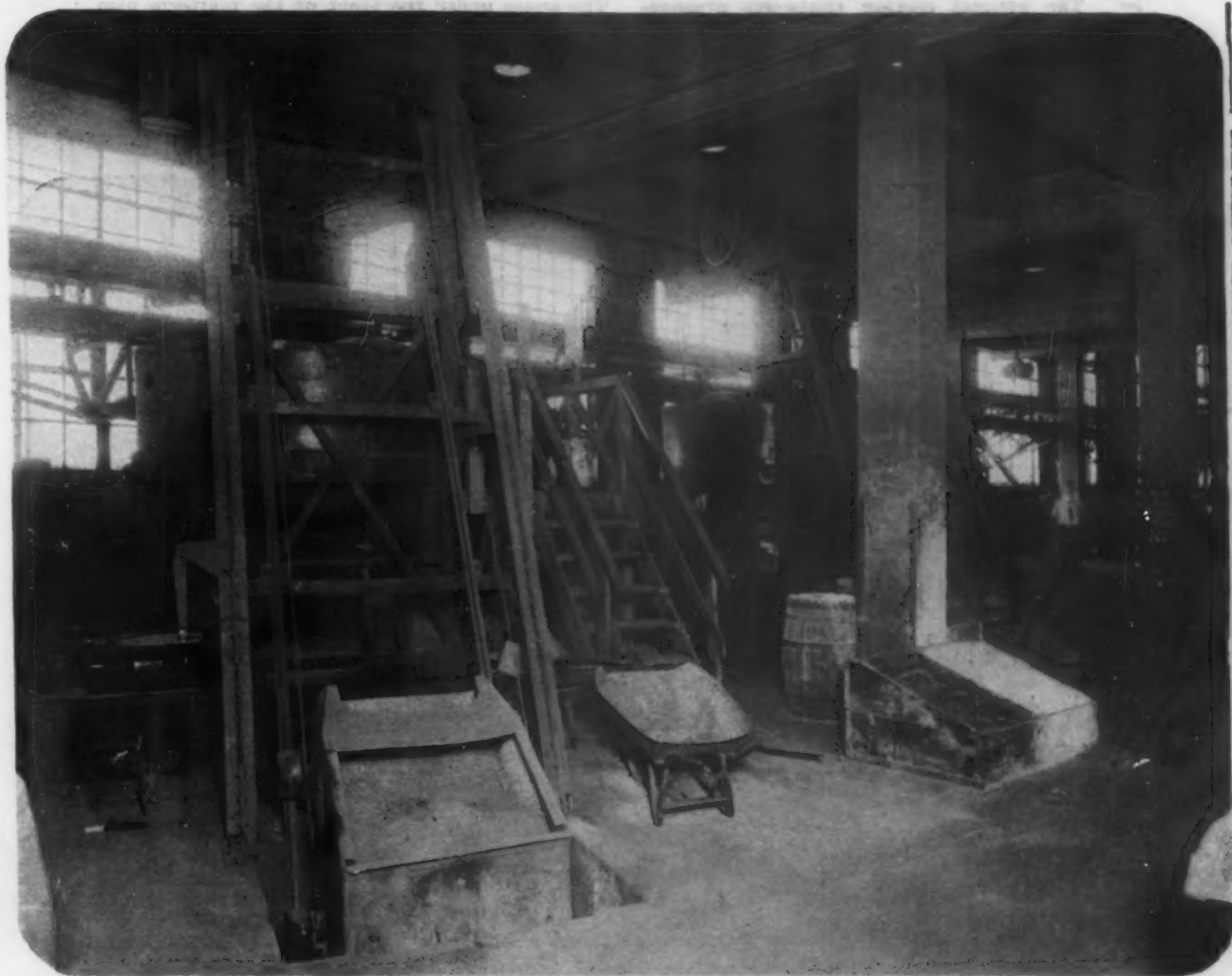
superimposed one above the other. Both are fired from a common firebox below the foundry floor. In connection with the stack, shown at the right, a difficulty was encountered, i. e., to pass it between two crane runways. To that end it had to be flattened out. A core rack with the lift truck partially under it is visible at the right.



3— Looking toward the core room on the main foundry floor level. At the right is a hydraulic elevator, which conveys material from the foundry up to the core room level. The cores from the upper core room may be delivered to the foundry either by overhead traveling crane or by means of the elevator and trucks on the foundry floor level. In front of the elevator is a certain area of the foundry devoted to the making of heavier cores and these are dried in a battery of three ovens which are located under the four ovens situated above. The larger oven is shown at the right and the two smaller are reached from beneath the platform at the left. This platform is connected with the general mold shake-out system. Any molds made in the bay in which the core room is located may be set upon the platform and then shifted over under the other crane runway to the shake-out platform.

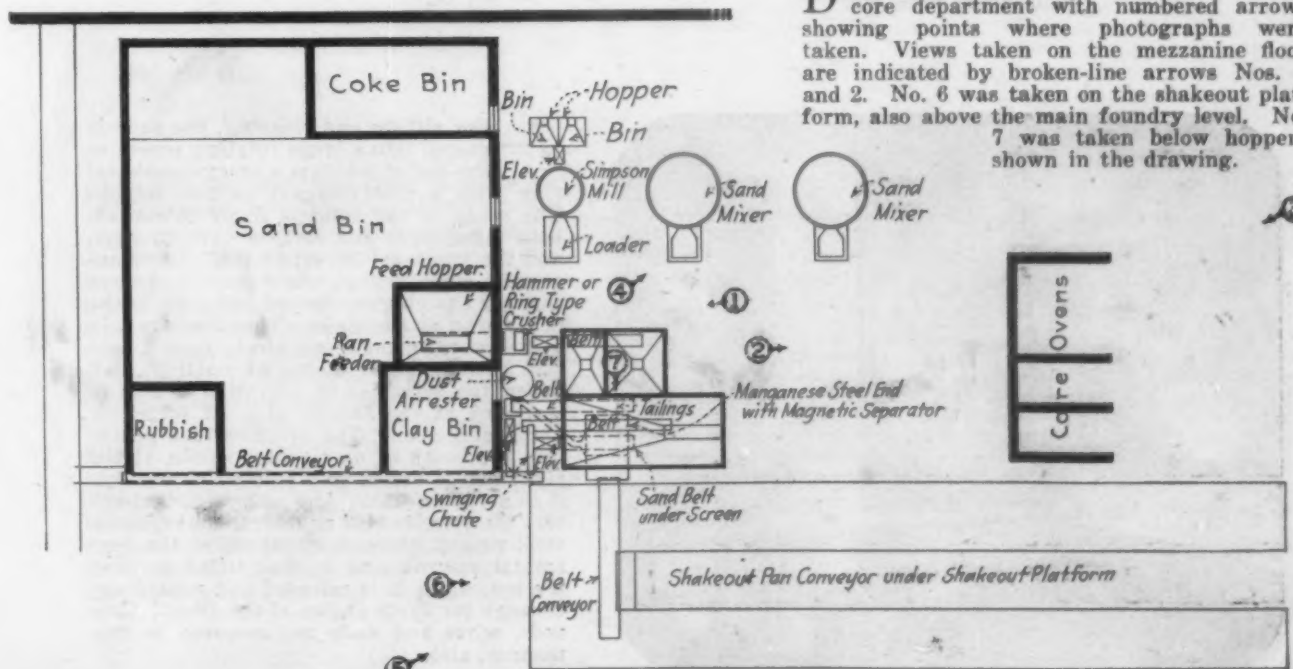


of a Foundry



4—Beneath the core room are located three Simpson mixers—two for facing and backing sand, which are shown, and another for making core sand. The mixers are equipped with skip loaders and the sand from them is taken away in boxes on lift trucks. After the

boxes reach the main foundry they may continue to their destination by lift truck, or they may be handled by traveling crane. There are doors in the sand bin wall on this level so that both new and old sand are available only a few feet from the mixers.

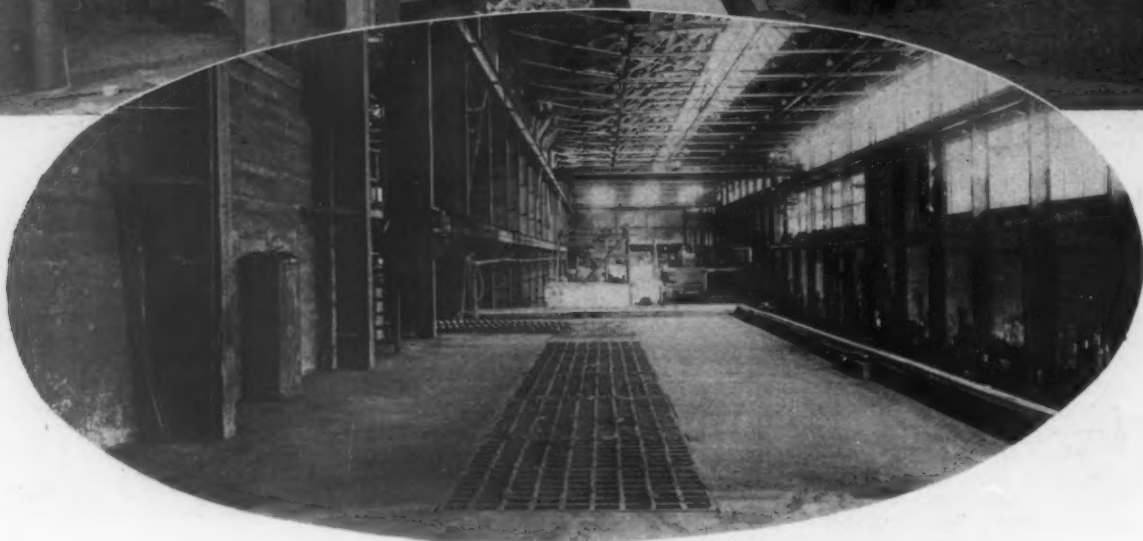


DETAIL of main floor of sand handling and core department with numbered arrows showing points where photographs were taken. Views taken on the mezzanine floor are indicated by broken-line arrows Nos. 1 and 2. No. 6 was taken on the shakeout platform, also above the main foundry level. No. 7 was taken below hoppers shown in the drawing.

Photo-Story

5—The general casting shake-out arrangement consists of an elevated platform a little over 100 ft. long. This is a reinforced concrete structure and the object of elevating it was to provide for sand handling equipment underneath, without recourse to a tunnel.

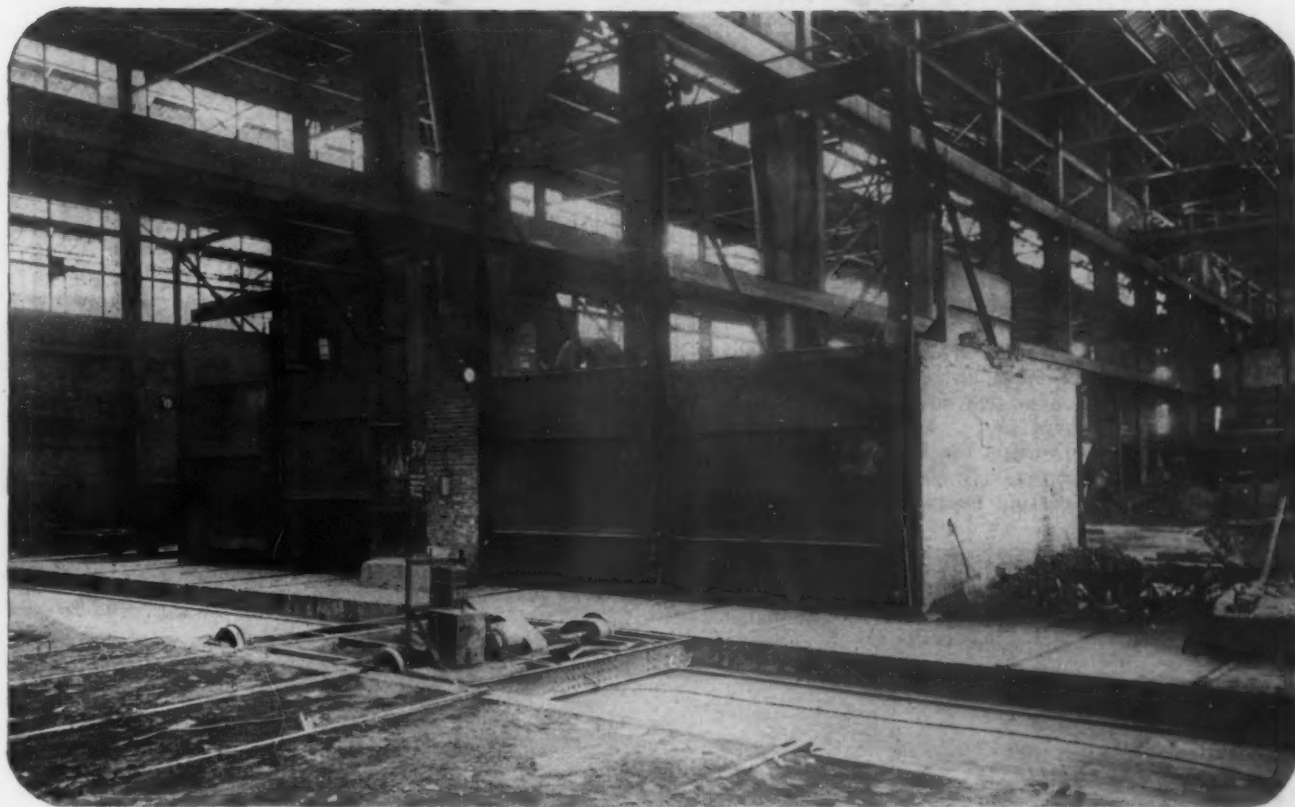
The space under the front of the platform also affords protection for men passing the shake-out. Beneath the platform also much of the wire and rod straightening is done. The core room is located back of the wall in the rear and is several feet above the platform.



6—Flasks are brought to this platform and shaken out over the gratings. The sand is then taken away on a pan conveyor and put through equipment to separate lumps, rods, etc.



7—For sifting and cleaning, the sand is passed into a large rotating screen at the end of which is a manganese steel ring with a fixed magnet on the outside. The scrap in the sand is likely to contain both manganese and soft, or carbon, steel, and the two must be separated. The manganese steel, being non-magnetic, passes through the ring at the end and then to the belt shown at the right. This discharge, in addition to manganese steel, consists of core butts and hard lumps of molding sand. When the screen is in operation a man is stationed at the belt to pick off pieces of manganese steel. The overflow then passes into the booth of an elevator shown at the right and is raised to a belt which conveys it to a rubbish bin. Any soft steel that enters the sieve is held against the manganese steel ring at the end by means of the segmental magnet and is thus lifted to near the top, where it is released and passed out through the chute shown at the front. Core rods, wires and nails are removed in this manner, also.

of a Foundry

8—In addition to the core work in this plant it is necessary to dry many molds which are of considerable size. To accomplish this a battery of five drying ovens has been located in the middle of the plant. At one side there is a battery of four ovens served by a transfer car, as shown, and in each bay of the foundry there are three set-off tracks connecting with the system, so that cars may be filled before going into the oven and cars of baked molds may be stored at the other end. Under ordinary circumstances all molding is done in the bay from which this view was taken and the pouring is done in the further bay. The transfer car serves not only to spot the cars of molds in front of the respective ovens but also to transfer the

molds from one bay to the other. In addition to work of this class it is occasionally necessary to make a very long manganese steel piece and for this purpose there was placed back of the battery of four ovens a single oven with doors at each end. One set of doors can be seen at the right projecting above the roof of the oven. In this case the mold is made in the molding bay (in the right foreground), is run into the oven for drying and then taken out into the casting bay (at the left). To conserve working space all five ovens are fired from pits arranged beneath the foundry floor. In connection with these ovens as with the battery of core ovens, the stacks had to be broadened out to a long thin rectangle to get them between the crane girders.

9—The melting equipment consists of two electric furnaces placed on an elevated platform underneath which the transformer equipment is located. The stock bay is behind the platform and is served by a crane which unloads the raw material into the bins and then delivers it to the charging platform. The ladles are placed in pits in front of the furnaces for filling. This view was taken from the top of a mold-drying oven and in the foreground may be seen one of the mold cars and one of the set-off tracks. Between these tracks and the furnaces there is a transfer truck used for returning empty flasks from the pouring bay to the molding bay, and on this car is one of the long flasks for use in the long oven referred to.



Metallurgy of Iron Dryer Rolls

Intricate Mechanical and Chemical Problems— How They Were Solved—Ingenious Set-Up of Mold

BY J. W. BOLTON

SEVERAL years ago the writer was retained as consulting metallurgist by the Black-Clawson Co., manufacturer of paper mill machinery. This firm had completed a program of mechanical standardization, attaining a quality of workmanship exceeding that found in most shops and, also, insuring flexibility in interchangeability of parts. For various reasons it was felt desirable to extend the improvement program into the foundry, particularly to get high grade uniform iron and low casting losses. This end has been

nearly 450 lb., and the utmost possible jiggling with machining and with manhole plates in the shop will account for only about 100 lb., the skill in molding is apparent.

The set-up of the mold is ingenious. A collapsing core barrel is used and all the core removed through a small manhole in the head. The bottom and top journals are chilled. (The castings are poured on end.) No attempt is made to remove the inner skin of the barrel of the roll as this would materially increase the

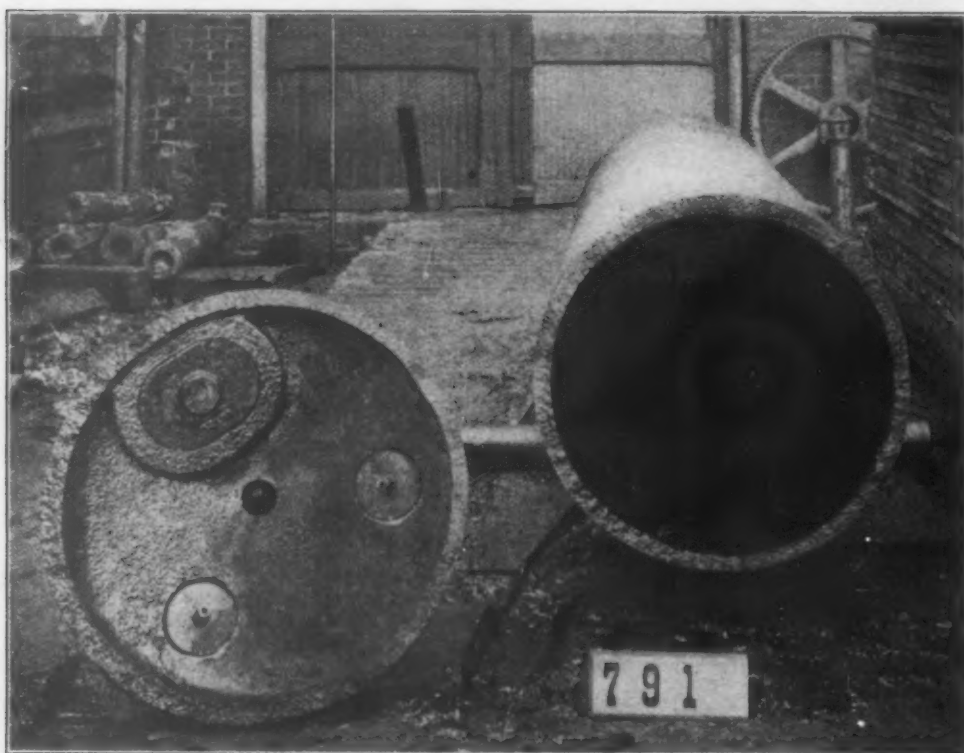


Fig. 1—This 30-In. Dryer Roll Withstood 1250 Lb. Per Sq. In. Hydraulic Pressure Before Bursting. Note the uniformity of metal section. The core is removed through the large manhole shown. This test was conducted in the presence of representatives from the Traveler's Indemnity Co. and the American Laundry Machine Co.

most happily accomplished. The experiences gained are of practical value to foundrymen.

One type of casting made by this firm may be properly termed a specialty—seamless dryer rolls. These are used in foudrinier machines, laundry machines and others requiring such rolls. Their function is to dry the paper or other material. They are steam heated and used in batteries of as many as 90 in paper machines. The castings are up to 60 in. in diameter and 15 ft. long, $1\frac{3}{4}$ in. metal in the shell, as cast, and cast with seamless heads with journals cast on. The cylindrical portion is machined all over, then ground. The slightest flaw in the finished roll is sufficient reason for rejection. Besides this, the rolls must balance within a very few pounds. When one considers that a core, set $\frac{1}{8}$ in. off center, will throw a large roll off

possibility of steam leakage, lose the advantages of the seamless heads, and would not help in balancing. Fig. 1 shows results of a remarkable test made on one of these rolls.

Metallurgically, the problem is most interesting. The metal must be strong to support the weight of the casting—14,000 lb. in the rough for the largest rolls—and particularly to resist distortion during machining. It cannot have high contraction or the roll would burst. It must be fluid to run this large area and rather small thickness.

The mixture aimed at runs about 1.20 to 1.25 per cent silicon, carbon 3.40 to 3.55 per cent, manganese anywhere from 0.40 to 0.80 per cent, sulphur 0.090 to 0.120 per cent, and phosphorus 0.35 to 0.60 per cent. This produces a high grade iron for the purpose. The

GRAY iron castings which present a "beautiful appearance to a metallurgist" are described in this article. The securing of the proper mixture and minor changes in rig-up eliminated certain troubles which have resulted in the production of almost a perfect casting. The author is metallurgist, Niles Tool Works Co., Hamilton, Ohio.

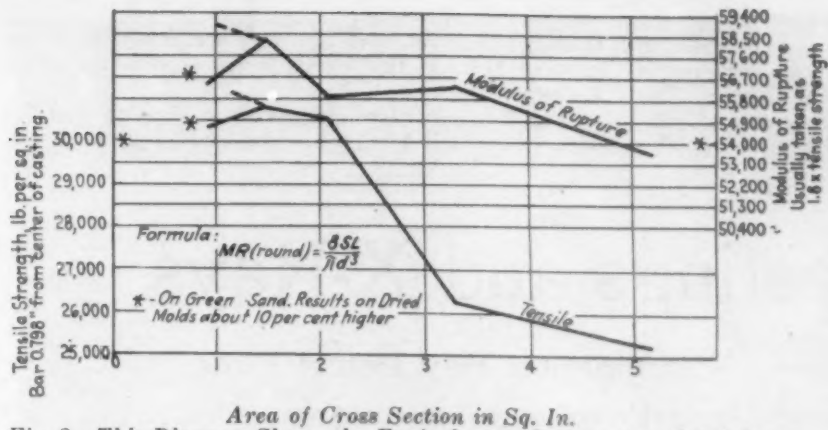


Fig. 2—This Diagram Shows the Equivalent to Comparative Total Areas or Roughly to Cooling Rates

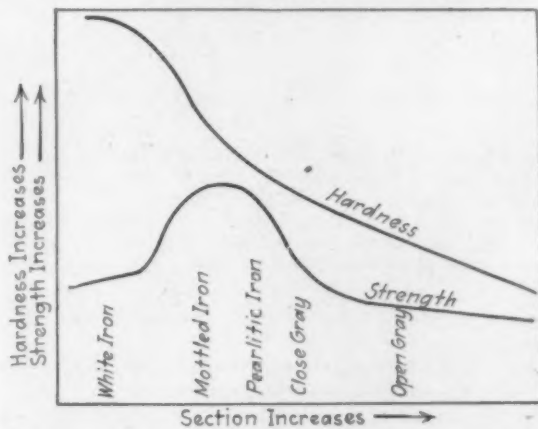


Fig. 3—Qualitative Diagram, Strength-Hardness Section

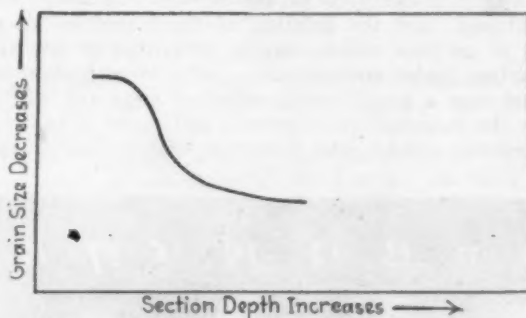
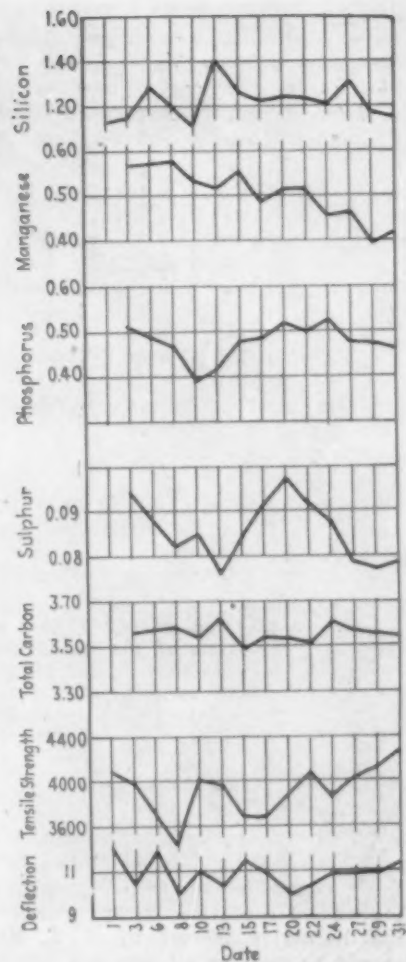


Fig. 4—Qualitative Diagram, Grain size and depth of section

Fig. 5 (Right) —Routine Analysis Sheet Showing How the Mixture Is Checked Up by Analysis and by Physical Test



finish is excellent, machinability good, and strength satisfactory. For heavier castings, lower silicon is used and for the lightest rolls silicon is raised. Phosphorus has been run as low as 0.30 per cent, with silicon 1.00 per cent and no bad effects noted but, with low silicon and phosphorus 0.60 per cent or above, hard rolls are encountered. Manganese 0.30 with sulphur 0.12 per cent caused no difficulties, but is not advised. Lower carbon in increasing contraction might cause trouble. With good coke, analyses come very uniform. Soft structure coke gives trouble.

The table and Fig. 2 give results of some tests made on this metal. While interesting in themselves, these results also illustrate some fundamental principles

Table of Physical Tests and Chemical Analyses										
Diameter as Cast	Tensile No. per Sq. In.	Transverse Total Load	Mod. of Rupture	Carbon	Silicon	Mn	S	P	Area	
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1.100	32,250	2,570		3.49	1.06	0.33	0.112	...	0.950	
1.100	30,120	2,400		3.49	1.29	0.950	
1.100	31,350	2,530		3.52	1.22	0.56	0.075	0.58	0.950	
Average	30,425	2,463	56,550	3.47	1.18				0.950	
1.375	29,920	5,010		3.30	1.25	...	0.092	...	1.465	192 Brinell
1.375	31,180	4,890		3.38	1.28	...	...	...	1.465	
1.375	31,180	5,000		3.54	1.29	0.48	0.098	0.57	1.465	
Average	30,760	4,967	58,381	3.41	1.27				1.465	Dried sand
1.625	31,340	8,420		3.45	1.34	...	...	...	2.074	Dried sand
1.625	29,740	7,280*		3.50	1.22	0.69	0.077	0.56	2.074	Dried sand
Average	30,540	7,850	55,906	3.47	1.28				2.074	Dried sand
2.125	25,820	19,460		3.38	1.27	...	0.114	...	3.546	Dried sand
2.125	23,800	17,080		3.40	1.20	0.45	0.098	0.39	3.546	Dried sand
2.125	24,380	16,750		3.44	1.27	...	...	...	3.546	Dried sand
2.125	28,440	17,190		3.46	1.05	...	...	...	3.546	Dried sand
Average	26,110	17,670	56,273	3.42	1.20				3.546	Dried sand
2.625	23,200	30,650		3.34	1.29	...	...	...	5.412	170 Brinell
2.625	26,400	30,200		3.46	1.22	...	...	...	5.412	
2.625	26,640	34,000		3.50	1.17	...	...	...	5.412	
Average	25,330	31,617	53,412	3.43	1.23				5.412	Dried sand

*Modulus of rupture for round bars = $\frac{8SL}{\pi D^3} = 30.56 \frac{S}{D^2}$
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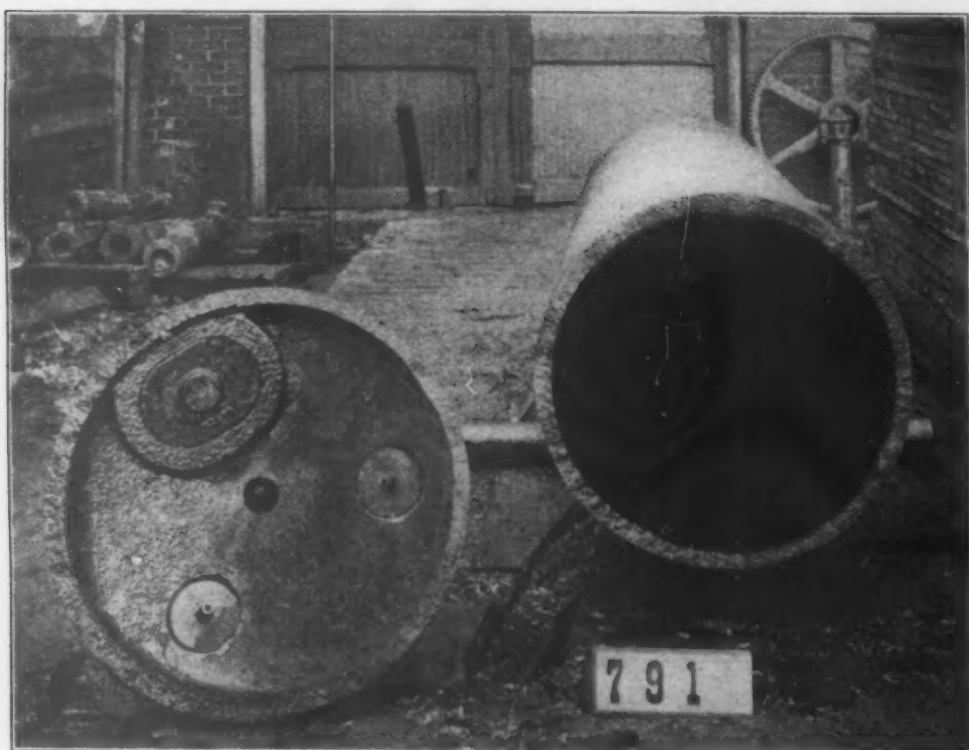


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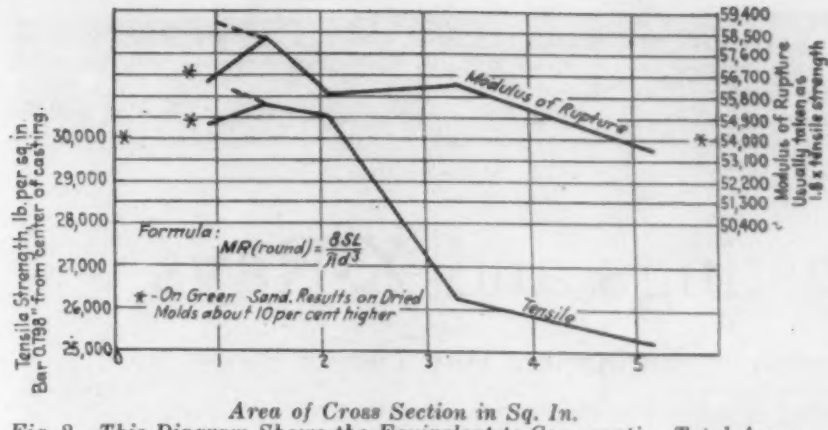


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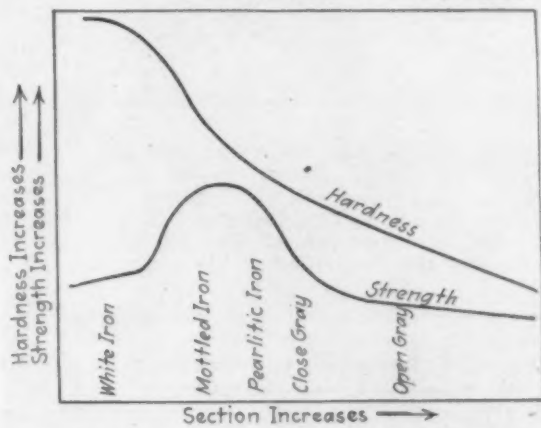


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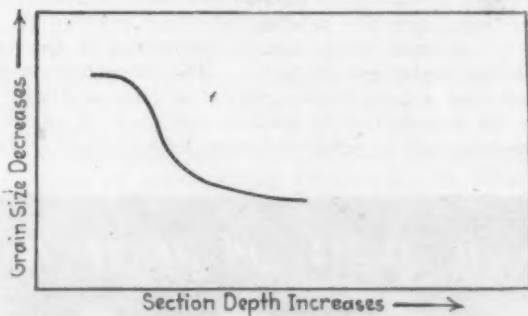
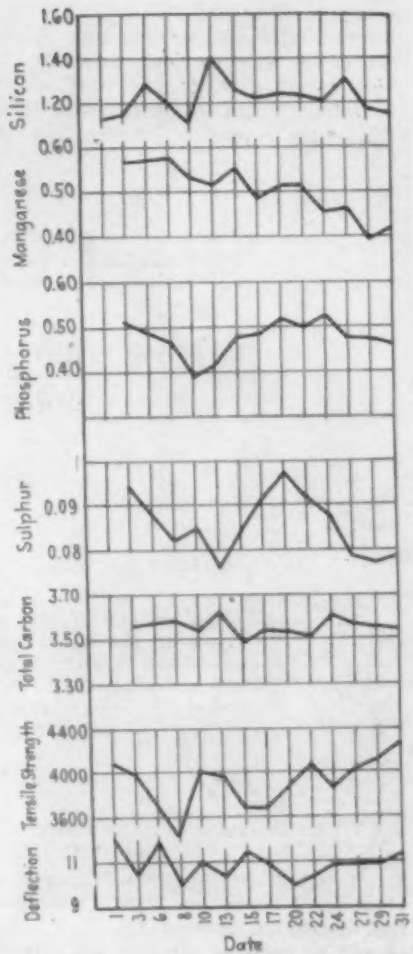


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often overlooked by engineers. These are (1) strength decreases with section size, and (2) this increase is *most rapid* in the central portions of the casting. The modulus of rupture decreases with slower rate of cooling, but the tensile test decreases even more rapidly.

Diameters must be measured very accurately when calculating M.R., as this varies inversely with the cubed diameter.

Fig. 5 is a routine analysis sheet showing how the mixture is checked up by analysis and by physical test.

Steel Castings and X-Rays

How Fluoroscopic Examination May Detect Blow Holes and Slag—Possible Substitution for Radiography

BY DR. ANCEL ST. JOHN

THE author of this paper, who is a consulting physicist in New York and who is one of the authorities on X-ray crystallography and radiography in general, believes that he has hit upon a method of examining castings which will prove of practical value to steel foundries. If blow holes and sonims can be detected in valuable castings before machining, a long step in advance will have been taken. The desired end depends on further research. The article discusses the foundation of the work.

AT the Atlantic City convention of the American Society for Testing Materials in June, 1925, the committee on metallography submitted a comprehensive report on X-ray testing. This report and the discussion thereof by V. T. Malcolm and others should be read by all who are interested in the application of X-ray methods to industrial problems. In his own discussion of the report the writer stated his belief that for many types of castings it would be possible to substitute fluoroscopic screen examination for radiography, thereby reducing materially the cost of X-ray inspection. This belief was based upon the

early results of an extended investigation of this question which had just been instituted.

In the course of this investigation quantitative data will be secured on the size of the smallest cavity which can be detected by trained and by untrained observers in various thicknesses of the metals commonly used in castings, and the relation of these cavities to the sizes of cavities which can be permitted in the type of casting under consideration. The investigation will extend over a considerable period of time and will require the cooperation of makers and users of castings. The results will be published from time to time as they

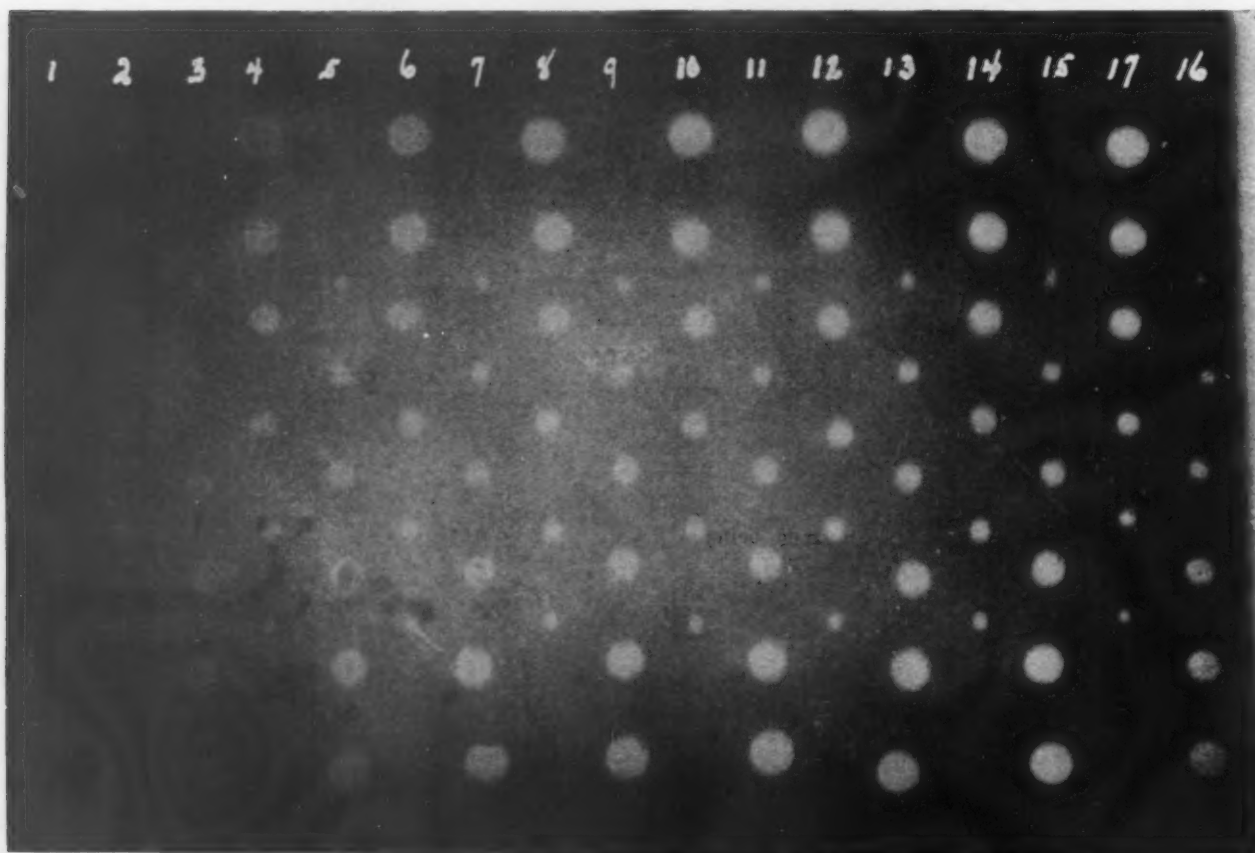


Fig. 1—A Radiograph of the "Synthetic Specimen" Plus 83 Additional Sheets of Iron Making a Total Thickness of 100 Sheets or 1.4 In.

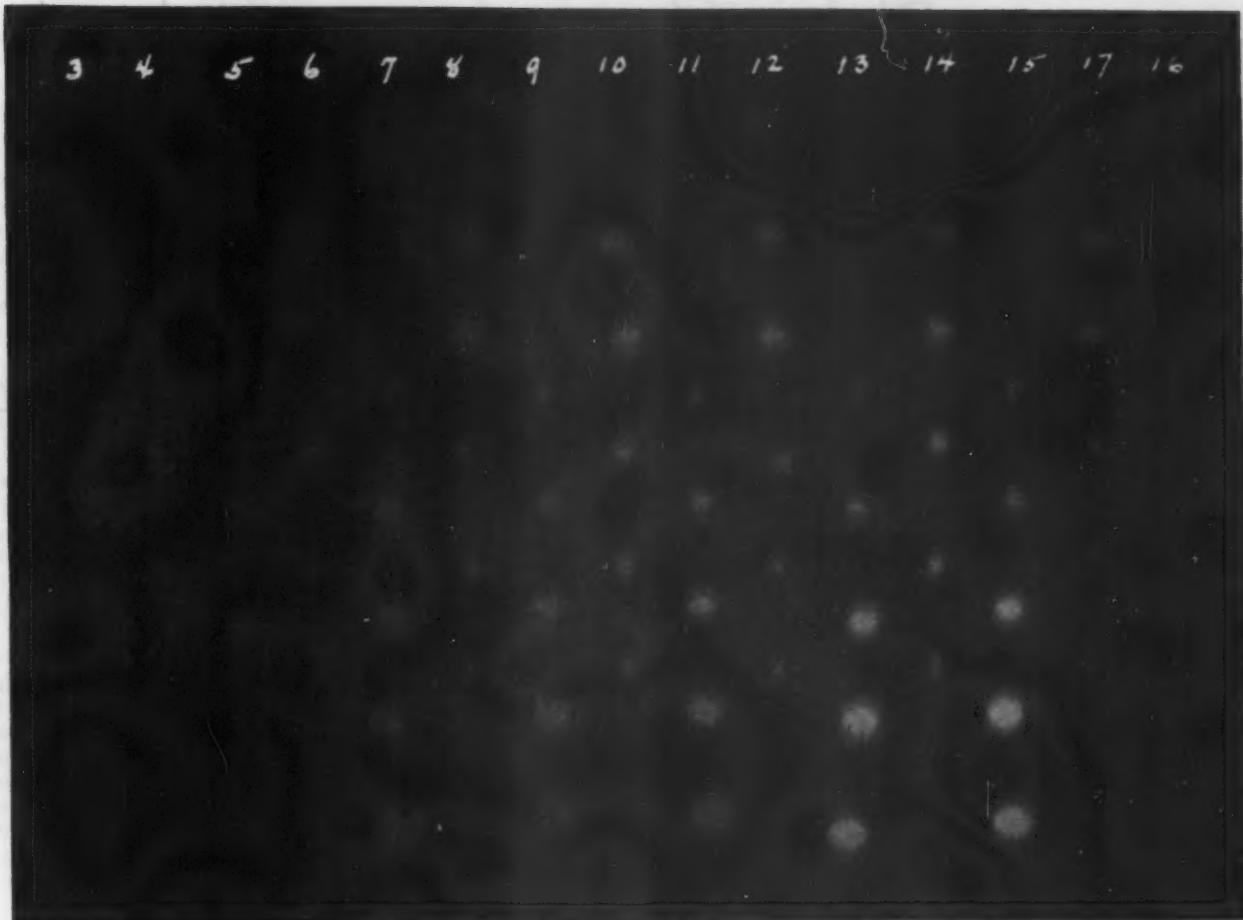


Fig. 3—In This Radiograph the "Synthetic Specimen" Was About 2 In. from the Film With Extra Sheets Between

are secured. The present article describes preliminary work in the determination of the size of detectable cavities in steel.

The facilities used in this investigation have been provided by the Wappler Electric Co. of Long Island City, N. Y. The X-ray equipment consists of a power plant capable of generating an effective voltage of 200,000 corresponding to a maximum voltage of 300,000 such as is required for satisfactory radiography of three inches of steel, a water cooled X-ray tube of the Coolidge type capable of carrying a current of 30 milliamperes, the necessary apparatus for circulating and cooling the water, a lead-covered drum surrounding the tube which permits the X-rays to escape only through predetermined openings before which the specimens are placed, a blowing equipment for circulating air through the drum, a portable dark-room booth, and the necessary control devices. The walls of the dark-room booth were of Beaver board and had a negligible absorption for X-rays.

During a part of the investigation the specimens being examined were set up between an aluminum window in the lead drum and the wall of the booth, manipulation of the specimen being made by the assistant who operated the controls. This was found to be inconvenient and the booth was placed with the wall in contact with the window, the specimen being set up on a stand within the booth. In this way the observer could manipulate the specimen at will without leaving the dark-room. In both cases a simple arrangement of auxiliary lead shields was effective in preventing the escape of secondary radiation.

The customary type of barium platino-cyanide fluorescent screen was used for detecting the X-rays. Most of the observations were made with a screen covered with four sheets of $\frac{1}{4}$ -in. lead glass to absorb the rays and protect the observer. These were not cemented together and so caused much destruction of detail through multiple reflection. This disadvantageous condition was intentional as it was desired to get the data under as poor conditions as might be met in actual practice. Some observations were made using

a periscopic arrangement of mirrors and a reading glass of rather low power, and a few were made with a 2-in. lens and but one sheet of lead glass.

The specimens examined were made by piling together numerous sheets of transformer iron 0.014 in. thick. Seventeen such sheets were drilled in a systematic manner and bolted together to form a "synthetic specimen." The appearance of this specimen is depicted in Fig. 1, which is a radiograph of the specimen plus 83 additional sheets of the iron, making a total thickness of 100 sheets, or 1.4 in. Each vertical column of spots represents a series of holes drilled through the same number of sheets of the specimen, column 1



Fig. 2—Focal Spot From Which the X-Rays Proceed

being through one sheet, column 2 through two sheets, column 3 through three sheets and so forth. The drills used were Nos. 1, 10, 20, 30, 40 and 50. In the original negative the spots in column 1 and a No. 60 hole

through one sheet at the bottom of column 16 can just be observed, while the spots in column 2 are plainly discernible.

The tube used was originally developed for the so-called "Deep Therapy" medical treatment. Though able to carry 30 milliamperes continuously it was operated at only 10 milliamperes so that the results might be comparable with those obtainable with other less powerful tubes. The focal spot from which the X-rays proceed was very broad, as shown in Fig. 2, which is a picture made by X-rays passing through a fine hole in a lead shield midway between the target and the film so that the image is natural size. The effect of the breadth of the focal spot is not noticeable in Fig. 1, for the "synthetic specimen" was only about $\frac{1}{2}$ in. from the film, with the extra sheets of iron between it and the tube. In Fig. 3, however, the effect is marked. Here the "synthetic specimen" was about 2 in. from the film with the extra sheets between the two. In making the negative for Fig. 3 columns 1 and 2 were unfortunately screened off. It is probable that the smallest hole in column 1 would not have been observable.

The fluoroscopic tests were made on samples ranging in thickness from 20 sheets (0.28 in.) to 100 sheets (1.4 in.) under the least favorable conditions, that is, with the screen covered with four sheets of lead glass, the unaided eye could always pick out the column for which the holes were through only one-tenth the total thickness, and for the greater thicknesses could pick out holes having a diameter as small as the same amount. For lesser thicknesses there was some difficulty in picking out the correspondingly small holes. When but one sheet of lead glass covered the screen and a 2-in. lens was used to aid the eye a No. 30 hole through six sheets in a total of 100, and a No. 40 hole through two sheets in a total of 50, were observed.

When the lead glass was omitted and the protection of the observer was secured by viewing the screen in a mirror with the aid of a reading glass a No. 30 hole through four sheets in a total of 50 was readily observed. Under these circumstances the No. 40 hole through four sheets and the larger holes through three sheets were occasionally discerned, but they must be classified as difficult to detect. With an arrangement of two mirrors and the reading glass the No. 30 hole through five sheets was readily observed but the No. 40 hole and the holes through fewer sheets were again difficult to detect.

These results show that under the conditions of the tests, which correspond to the most unfavorable conditions that would be met in actual practice, isolated defects having a diameter as small as $\frac{1}{10}$ th the thickness of the part examined can be detected without difficulty. Any improvements in technique, such as better screens, better arrangements for viewing the screen, use of tubes having a smaller focal spot, would all tend to increase the ability to discern smaller cavities. Any accumulation of cavities, such as constitutes porosity, pipe, sand holes or slag inclusions, would correspond to superposed holes through several layers, or holes of larger cross-section, or both, and would so be more readily detected.

It is not within the scope of the present paper to say whether or no all cavities smaller than those which can be discerned in this way can be tolerated in castings. That can only be determined by the appropriate coordination of X-ray and mechanical tests. But when it is considered that a cavity $\frac{1}{10}$ in. in diameter in a member 1 in. sq. represents a deficiency of but one per cent in the material supposed to be present in the plane through the cavity, it is believed that many types of castings may have tolerance limits and dimensions permitting fluoroscopic X-ray inspection.

Recording Temperature of the Iron at a Cupola Spout

Probably one of the most interesting papers prepared for presentation at the iron sessions of the Syracuse meeting of the American Foundrymen's Association, Oct. 5 to 9, will be the paper on "Continuous Iron Temperatures Recording," to be presented by H. W. Dietert and W. M. Myler, of the United States Radiator Corporation of Detroit. After trying out the many various ways of determining iron temperature, the foundries of this corporation have developed a method whereby iron temperatures are practically controlled. After using various methods of direct reading without success, a method of recording the temperatures of the gases above the iron stream has been worked out which gives a practical control which agrees with the best observation of experienced foundrymen. The method used is fully explained and illustrated in the paper by these two engineers.

Brass Association Prepares Catalog

A new official catalog was considered at a meeting of the National Association of Brass Manufacturers held at Hotel Hollenden, Cleveland, Sept. 8 to 10. The book will be arranged according to the kind of goods that are installed in a building—first, taking what are commonly known as roughing-in goods or unfinished products, used in the basement, such as ground-key, compression stop and drains, sill and sediment faucets, brass fittings and ferrules; then, sink and tray faucets, lavatory fixtures and nickel-plated goods of a variety of kinds used in up-to-date plumbing. The convention also approved an illustrated booklet showing the right and wrong ways of handling and installing plumbing brass goods. This will be distributed among master plumbers purely as educational matter. It will also be supplied by members of the association among their jobbing trade and customers to aid in disseminating information regarding the proper use and installation of plumbers' brass goods.

American standards, as well as the nomenclature of the association, are being adopted in Canada, according to a communication from S. J. Frame, secretary Brass Goods Manufacturers' Council of Canada, which was read at the meeting.

An associate membership in the Arbitration Foundation, Inc., New York, was ordered.

The annual meeting of the association will be held in New York, Dec. 9 and 10.

Cost of Manufacturing Discussed

Discussing "The Cost of Manufacturing" in *United Effort*, the house organ of the United Engineering & Foundry Co., Pittsburgh, F. C. Biggert, Jr., tells of the harmful misunderstandings which sometimes arise in industry due to the mistaken idea of some poorly informed people that profit is the difference between the cost of wages and material and the selling price of the product. He takes up one by one the various items in the cost of a product, including such well known factors as repairs to tools and equipment, purchase of tools, lubricants and supplies, taxes and depreciation. He goes into a detailed discussion of the "direct labor hour" and the work that should be charged to it.

Most of Mr. Biggert's article is based on conditions as he has found them in the machine shop of the United Engineering & Foundry Co. His article began in the July issue and is concluded in the August issue.

The Weirton Steel Co. has been granted a Federal permit to build a river loading terminal at its plant at Weirton, W. Va. The new terminal will include a 200-ft. loading dock and a 400-ft. unloading dock. Three ice breakers will be installed at the plant. It will be necessary to dredge approximately 36,000 cu. yd. of material from the harbor at that point to install the docks. These docks and harbor facilities will enable the company to handle coal from its mines above Brownsville, Pa., to the coke plant by river and river shipments of steel.

New Records by Steel Treaters

Technical Program of High Merit and Splendid Attendance at Seventh Anniversary of American Society for Steel Treating—Largest Steel Exposition

BOTH technically and as an exhibition the annual gathering of American steel treaters this year set a new mark. It has definitely become one of the leading events in the year's history of the steel industry—eagerly looked forward to by metallurgists, steel treaters and steel equipment makers. All past records were easily eclipsed in the quality of the program, in the attendance of leading metallurgists, steel men, and others, in the size and success of the exposition and in other respects. It was the seventh annual convention and national steel exposition of the American Society for Steel Treating which met in Cleveland last week, Sept. 14 to 18. Praise and admiration for the smoothness with which this really large undertaking passed off was heard on all sides.

Registration of members, exhibitors and guests is officially reported as 5420. Of these 1912 were members, which is about 58 per cent of the total membership—a new record. At Boston last year 1210 members were present or 40 per cent of the total.

The Technical Papers and Discussions

FROM a technical standpoint the convention was one of the highest in quality ever conducted by steel men in this country. The ten sessions, held mornings and afternoons each day in the ballrooms at the Hotel Cleveland and the Hollenden Hotel, respectively, were distinguished by an unusually large attendance and a keen interest in each session, even up to the last one. Seldom did the number present fall below 250 and at one session the attendance was at least 500. Men of prominence occupied the chair at each session and leading metallurgists read papers or participated in the discussions. For the first time preprints of the papers were available for distribution, some of them having been distributed earlier by mail. By the time the sessions were opened about 75 per cent were in printed form.

It is possible in the following columns to give only a brief account of the leading subjects brought out and discussed in the 35 papers on the program.

Session on Steel-Making Processes

AN innovation in the usual program at these conventions was a session devoted to steel-making processes. The introduction of papers on this subject is significant. It is generally taken to mean the first step in a wider field of endeavor for the society—other subjects besides steel treating. The fact that the attendance—close to 500—was the largest of any, attests to the interest displayed by members and to the probable success of future attempts. Dr. John A. Mathews presided.

Proportion of Heat-Treated Steel: The program was introduced by a brief paper by C. J. Stark, editor *Iron Trade Review*, Cleveland, on the "Proportion of Heat-Treated Steel to Total Production." The speaker stated that the steel industry is passing through a transition period in which quality steel is now more the aim than quantity. Significant of this trend is the recent decision of the United States Steel Corporation to build a large alloy steel mill at Chicago. Citing the automobile industry as the largest user of heat-treated steels, he gave figures for 1924 that showed for every 1600 tons of rolled steel consumed by that industry 1000 tons was heat treated. While the railroads are the largest consumers of steel, they are the poorest users of heat-treated material. In his opinion 3,000,000 to 3,500,000 tons of steel is heat treated each year.

The Acid Open-Hearth: The "Acid Open-Hearth Steel Melting Practice" was discussed by Radclyffe Furness, superintendent of melting and forging departments, Midvale Co., Nicetown, Philadelphia, one of the leading authorities on open-hearth melting. The characteristics of the process as well as the reactions and the composition of the slags were fully treated. The details of charge, melting and pouring temperature and the making of additions were discussed. Reasons for the superiority of acid over basic steel were also given with emphasis on the importance of the proper "conditioning" of both, stating that this has a great influence on the defects which may appear in the finished product.

Discussion: A written discussion by Walter H.

White, of the Naval Gun Factory, Washington, was read by Jerome Strauss, of the same organization. Recalling the fact that much high grade acid open-hearth steel has been made at Midvale, Mr. White claimed that the superiority of acid steel was not due to a silica bottom and to slag reactions altogether but that the use of high-grade scrap was a large factor. Much high grade basic steel, both plain carbon and alloy, is being made due to more scientific melting which is being standardized.

The Basic Open-Hearth: The basic open-hearth process was dealt with in a paper "Basic Open-Hearth Steel" by Edward Whitworth, Bourne-Fuller Co., Cleveland. Mr. Whitworth treated the subject under three heads: History, furnace design and practice for high carbon forging steels. For the latter he advocated the use in a 100-ton heat, of about 10 per cent of lime, 60 per cent scrap and the remainder pig iron with cold or a hot metal. About two-thirds of a pound of aluminum per ton of steel should be used and when poured from the ladle, a scull of about 1500 to 2000 lb. should be left. Most additions should be made in the furnaces.

Discussion: In reply to a question as to the cause of laminations, Mr. Furness stated that it would be difficult to determine all causes. Some of them might be blow holes, included slag, crystal slips, etc., but in any case acid steel is more free from these causes than basic.

Delta and Gamma Iron: Dr. Zay Jeffries introduced at this point an interesting problem. It being pretty well established that delta steel exists as a body-centered space lattice formation, he asked whether any melters present had noticed the contraction and expansion of steel as it cools from the liquid to the solid state. At 1400 deg. C. the steel changes to a face-centered cubic lattice, gaining in density. At 900 deg. C. it goes back again to the body-centered cubic lattice. The shrinkage observable is particularly marked at these points in steel from zero to 0.55 per cent carbon. In other words, what is the amount of contraction as the metal passes from the delta to the gamma iron? Mr. Furness replied that he had observed some phenomena which tallied in a measure with these facts.

Chairmen of Four of the Sessions



DR. J. A. MATHEWS



DR. G. K. BURGESS



DR. ALBERT SAUVEUR



PROF. BRADLEY STOUGHTON

"Electric Furnace Steel": This was the title of a paper by F. T. Sisco, metallurgist air service, War Department, McCook Field, Dayton, Ohio, delivered in abstract by Jerome Strauss in the absence of the author. Two principal advantages of this process are claimed: Extreme flexibility and high quality steels produced in tonnage lots. Oxidizing conditions can be closely controlled either with complete oxidation, with partial oxidation or without oxidation. Under average

one this year was exceptionally good and one of the features of the technical sessions.

Three new machines for determining hardness were described in considerable detail during the symposium, thus providing more work for those investigators who are laboring to co-relate the results of the machines now commonly used. Dr. Albert Sauveur, Harvard University, has devised one called the "Durometer." It employs the idea used by some manufacturers of ball bearings—namely, to compare the rebound of a ball from a hardened surface. In the durometer, a standard ball is dropped a known distance, striking the surface to be tested, which has previously been mounted at an angle of 45 deg. to the vertical. The distance forward which the ball travels before striking some horizontal carbon paper is a measure of its hardness.

O. W. Boston, University of Michigan, also described two English machines exhibited at the Wembley Exposition. Both of these use the Brinell indentation principle, but are so designed that the rate of loading is automatically controlled, as is also the time at full load. One of them, the Vickers, uses a blunt four-sided pyramid instead of a ball; the impression on the tested surface is therefore a square. By adjusting a microscope slit to compass exactly the diagonal of this square, the Brinell hardness may be read directly on a graduated head. The machine is built like a stout punch, very rugged and strong. Lack of portability was mentioned as likely to counteract the advantages of easily and accurately estimating the diagonal of the square impression.

A comparative study of Brinell and Rockwell hardness numbers was presented by R. C. Brumfield, Cooper Union, New York. Using several alloy steels, heat treated in various ways, he secured the following relations:

$$\text{Brinell Number} = K \div (K_1 - R_s) = K \div (K_1 - R_c)^2$$

where R_b and R_c are the Rockwell numbers when using the ball and the cone, respectively. He found that the impression made by the 1/16-in. ball in material 100 hard was substantially a 1/16-in. spherical segment, that is, no apparent deformation occurred in the test. The 120-deg. cone, however, left a 113-deg. impression, thus introducing an error of 5 points in a material measuring 65 Rockwell cone hardness, the equivalent to about 65 Brinell numbers. For this reason he recommends the ball method for the harder metals.

An interesting observation was on the amount of hardening caused by the cold working under a Brinell ball. Brass measuring 50 Rockwell ball hardness on flat surface, tested 86 at the bottom of a Brinell ball impression.

Dr. H. P. Hollnagel, General Electric Co., West Lynn, Mass., gave a very clearly reasoned exposition

Features of the Technical Meetings

Symposiums on Hardness and on Metallurgical Education.

Important additions to the Literature on Tool Steels and Fatigue of Metals.

New Information on the Metallurgy of Magnetism.

Two New Devices for Measuring Hardness.

The Dilatometric Method of Heat Treatment and What It Means.

conditions, melting with partial oxidation is productive of the highest grade steel. The author discusses these various phases in considerable detail. Deoxidation and desulphurization are gone into fully as well as the procedure in completing the heat.

Discussion: Several electric steel experts discussed this paper. Charles McKnight, research department, International Nickel Co., New York, spoke of degasification as being sometimes overshadowed by deoxidation and as not being thoroughly understood. M. A. Grossman, metallurgist United Alloy Steel Corporation, Canton, Ohio, discussed the point brought out by Mr. Sisco as to the reactions between silicon and carbon, stating that silicon promotes the solubility of carbon monoxide in steel. The addition of ferrosilicon at the end of the heat was commended. Dr. B. Egeberg, Halcomb Steel Co., Syracuse, N. Y., discussed an 0.80 per cent carbon steel and a chrome-nickel steel made under both partial and complete oxidation conditions. Jerome Strauss, metallurgist, Naval Gun Factory, Washington, emphasized the fact that the character of the scrap and oxidation are important, calling attention to the importance of the reactions which take place on the furnace bottom as well as with the slag.

Symposium on Hardness

A symposium on hardness has been a regular feature of recent conventions of the steel treaters. The

of his thesis that all true hardness tests could be correlated by a study of the work done during deformation and the amount of strained material. Space does not permit an outline of the argument, but the preliminary work leads the author to be very hopeful that strictly comparable results may be obtained in this manner. The work done is measured directly from a stress-strain diagram developed during the test, while the amount of deformation is estimated from etch figures developed on the tested article.

Carbon and High-Speed Tool Steels

Interest in the week's program was manifested early. On Monday morning at ten o'clock at least 300 members gathered in the first session to hear a discussion of the influence of chemical composition on tool steel. An animated interchange of views took place between steel makers, who would rather sell on reputation and brand name, and steel purchasers, who would rather buy on specifications covering composition, hardness and structure. H. A. Schwartz was chairman.

Composition of Tool Steel: J. P. Gill and M. A. Frost, metallurgist and chief chemist for Vanadium-Alloys Steel Co., Latrobe, Pa., in their paper on "The Chemical Composition of Tool Steel" presented results of a number of chemical analyses of many American steels. They showed fairly wide variation in analysis in steels of the same general type and proposed for the same duty. Some of these have been produced in an effort to make a particular steel for a certain duty. Certain well defined limits appear to be indicated, however. For instance, in plain carbon steels, silicon should be below 0.40 per cent and manganese below 0.30 per cent.

Discussion: Subsequent discussion brought out many exceptions to these rules; for instance, manganese may readily be above that limit in the lower carbon varieties. It was also pointed out that, while nickel is usually excluded from carbon steels, its presence is not detrimental if the heat treatment is correspondingly altered (it requires a lower quench and draw).

In general it should be remembered that 0.05 per cent of chromium may be found in almost any tool steel by an expert chemist. However, 0.15 to 0.25 per cent of alloying elements like chromium or nickel will make considerable difference in a plain carbon tool steel, but a comparatively small difference in a high-tungsten steel, where the total amount of alloying elements approaches 25 per cent. H. J. French, Bureau of Standards, pointed out that the ratio between tungsten and vanadium was the most important chemical factor in high-speed steels—a fact which had taken many years to discover.

A. H. d'Arcambal, Pratt & Whitney Co., Hartford, Conn., presented the arguments for the purchaser, stating that after 50 years of buying steels by trade name, and six years of buying by chemical and physical specification, he had no doubt that the latter practice had resulted in lower manufacturing costs and better service records. Dr. J. A. Mathews, Crucible Steel Co. of America, however, was of the opinion that for the average purchaser it would be far better to rely upon steels of known reputation. Manufacturers in general have not only high standards but ideals as well, which are difficult if not impossible to express in a specification.

Unusual Metals in High-Speed Steel: H. J. French and T. G. Digges, of the Bureau of Standards, Washington, described some "Experimental Heats with Nickel, Tantalum, Cobalt and Molybdenum in High-Speed Steels." Tools made from these heats were then tested by F. W. Taylor's methods. Results with steels containing tantalum and columbium were disappointing. This result was found also by J. P. Gill, Vanadium-Alloys Steel Co., who made some 200 heats over a period of eighteen months. Some good steels were produced, but none better than the more common analyses.

Discussion: An interesting colloquy brought out the fact that the bluish and grayish white smoke from a molybdenum steel is actually molybdenum oxide, despite the fact that the Bureau of Standards was unable to discover any loss in the element by analyzing successive layers 0.003 in. thick from a tool which had previously been cleaned of scale. E. C. Bain, Union Carbide & Carbon Research Laboratories, said that a hot piece of molybdenum metal smokes very copiously in the air, but loses practically no weight when heated in a vacuum to above 2000 deg. C. Evidently the smoke is a voluminous cloud of oxide. Also the loss in molybdenum from a tool steel occurs almost exclusively in the scaled portion. Molybdenum diffuses very slowly in hot steel, with the result that when the scaled surface is ground off, metal of unchanged chemical composition remains.

Notched Bar Tests: Notes on a study of "Notched Bar" tests were presented by Paul Heymans, assistant professor of physics, Massachusetts Institute of Technology. Strips of transparent material were notched at the side, in a shape specified for various impact test bars, and the distribution of stress about these notches studied when the strip was under moderate tensile stress. By the photographic methods developed by Dr. Moser, it was shown that the stress at the base of the notch was as high as six times the average over the entire cross section.

Dr. S. L. Hoyt, General Electric Co., pointed out



The Largest Technical Gathering of the Convention. About 500 listening to papers on steel making processes

Authors of Papers Before Steel Treaters



H. F. MOORE



E. C. BAIN



D. J. MC ADAM, JR.



H. J. FRENCH

that Moser's method was confined to such materials as celluloid. Opaque metals could also be investigated, at least the strain distribution could be studied, by pickling or deeply etching the specimen while under test, when characteristic lines of zones of high deformation are indicated.

Cold-Drawn Bars and Shock Tests

An afternoon session was devoted to some interesting data on cold-drawn bars, a comparison between slow-bend and impact notched bar tests and a paper on the mathematics of probability in connection with ferrous materials. Dr. Zay Jeffries presided.

Cold-Drawn Bars: The paper by S. C. Spalding, of the Halcomb Steel Co., Syracuse, N. Y., on "Effect of Reheating on Cold-Drawn Bars" provoked much discussion. The broad conclusion was presented that cold drawing, even in heavy drafts, is in no way injurious to a material which is to be heat treated. The yield points of certain cold-drawn manganese-nickel and chromium-vanadium steels were considerable by reheating to 600 deg. Fahr. with only slight changes in tensile strength, ductility and toughness.

Discussion: R. S. Archer, of the Aluminum Co. of America, called attention to the spontaneous increase in hardness and decrease in plasticity in standing at ordinary temperatures which would continually eliminate the effects observed by Mr. Spalding. He questioned the conclusion that cold-drawn rods respond to heat treatment in the same manner as hot-rolled bars. Both Mr. Archer and W. J. Merten called attention to the existence of such previous literature on relieving internal strain in cold-rolled material, but Dr. Jeffries pointed out that some other explanation is necessary because of the wide departure of iron and steel from the usual behavior of metals having otherwise comparable properties. The conclusions of the author were supported by Prof. V. N. Krivobok, of the Carnegie Institute of Technology, Pittsburgh, who had noted decided changes in microstructure accompanying similar phenomena in his own specimens. He pointed out that certain of Mr. Spalding's photomicrographs indicated that such changes were occurring. Dr. Jeffries suggested as a possible explanation of the phenomena a solution and reprecipitation of some components and pointed out that the variation of solubility with temperature needs attention.

Mathematics of Probability: B. D. Saklatwalla and H. T. Chandler, of the Vanadium Corporation of America, Bridgeville, Pa., discussed the "Application of the Mathematics of Probability to Experimental Data as a Basis for Appropriate Choice of Ferrous Materials," in which "probability curves" on the hardness of flywheels and test bars were shown and analyzed. A more searching analysis was presented by E. Schweizer in two written discussions and Mr. Taylorson, American Sheet

& Tin Plate Co., Pittsburgh, showed several alternative methods of plotting and called attention to the convenience of "probability paper."

Slow-Bend and Impact Tests: A paper by S. N. Petrenko, Bureau of Standards, Washington, on "Comparative Slow-Bend and Impact Notched Bar Tests on Some Metals" showed the effect of shape and size of notch on the values secured, as well as the effect of breaking across and in the plane of rolling. Fiber and the presence of planes of inclusion were suggested to account for the larger values given by fibrous specimens when broken across the plane of rolling.

Industrial Oil Furnaces, Irregular Carburization and Structure of Steel

One of the afternoon sessions was devoted to industrial oil furnaces, irregular carburization—its cause and prevention and two discussions on certain phases of the structure of steel. E. C. Bain presided.

"Oil Burning Equipment for Industrial Furnaces": This was the subject of an interesting paper by W. H. Mawhinney, General Furnace Co., Philadelphia. This paper reviewed the installation and operation of oil burning equipment starting with the storage tank. The author said that mistakes are frequently made in the heating coils and tank connections. Steam coils should be provided in a storage tank to keep the oil warm enough to pump easily but care should be taken that these coils are not too large or too small. A good arrangement for average conditions consists of four lengths of 1¼-in. pipe the full length of the tank in series and reduced to ½ in. at the inlet and ¾ or 1 in. at the outlet to take off condensation. The inlet line through which the tank is filled should always be at least 3 in. when a pump is used for filling and 4 in. if gravity is depended upon. After leaving the tank the oil should pass through double strainers. The pumping system can be either steam or electric. It is advisable in most cases to install an oil heater between the pump and burners. Low pressure burners require a fan or blower. The two chief types are the positive pressure turbo-compressor and the constant volume blower, each of which has its advantages.

The author discussed the correct arrangement of the brick work inside the furnace. In his opinion all furnaces of side-fired or end-fired type should have a baffle wall in front of the burners. However, he stated that many rod heating, bolt and nut and other furnaces have burners which are fired directly at the furnace with apparently satisfactory results. The advantages of the bridge walls are that it holds back the flame and assures complete combustion before the products of combustion strike the stack to be heated. The chief causes of complaint are that a furnace will not heat up to the desired temperature or that it is hotter at some points in the chamber than at others.

Authors of Papers Before Steel Treaters



M. A. GROSSMANN



H. A. SCHWARTZ



O. E. HARDER



B. D. SAKLATWALLA

These conditions are usually due to size and location of flues, size of combustion space, excessive radiation through walls, size and number of openings other than flues and arrangement of baffles.

Discussion: In discussing this paper M. W. Hepburn, Surface Combustion Co., declared that there are two significant developments in the oil furnace. One is the automatic control of combustion and the other is the re-circulating gasification principle of oil combustion. Referring to automatic control, he said that equipment has been developed for large furnaces which both automatically controls the temperature and the combustion of the flue gases. A modification of this type may soon make it practical for small heat treating equipment. The hidden value of re-circulation has been little appreciated, he said. Instead of bridge walls and resultant destructive zones, it is possible by a venturi throat construction at the burner block to draw in at the combustion chamber a definite amount of hot flue gases which gasify the atomized oil and from there on carry out the combustion and heating distribution in a manner analogous to a rich producer gas. This principle has been applied to furnaces doing extremely fine heat-treating work and the uniformity of the temperature has been greater than with any other type of application. One feature, he said, is that the entraining force of the venturi can be utilized to draw much of the hot gas back to the starting point which otherwise would be lost out of the flue, this having the same effect as adding to the length of travel of the gases.

Irregular Carburization: A paper on "Irregular Carburization of Iron and Iron Alloys—the Cause and Prevention" was presented by W. J. Merten, metallurgical engineer with the Westinghouse Electric & Mfg. Co. He said that abnormality of steel and its behavior toward carburization or cementation while solid, has been given considerable attention and there has been a mass of circumstantial evidence for the conviction of steel as the guilty party, but that an investigation of the carburizing process in its various details as possible offender seems to have been overlooked. It was his purpose to show that at least some of the so-called abnormal steels have been carburized perfectly and that much of the condemnation of steel is due to the carburizing process rather than to steel itself. The author reviewed the details of the carburizing process and described a method that he has employed with very satisfactory results.

Pointing out that a purely gas pressure contact carburizing is a desirable process for quality results, Mr. Merten said that to obtain this in the old style carburizing boxes and without radically changing the process, a series of screens were made which keep the solid carburizing compound from coming in contact with the parts and permit the suspension of

these parts. These preferably are made of copper in cylindrical form. Spacing and packing were no longer necessary and a simple filling of the carburizer around the screened part was the only care expected of the operator. The screening out of the fine and pulverized carburizing dust became unnecessary, which resulted in economy. By using these screens he said the improvement in the uniformity and depth of case was manifest and a greater concentration of carbide was procured. The material should be in the normalized or annealed state before subjecting it to this process.

The myth of abnormal steel, said the author, no longer enters in the calculation of results and satisfactory carburizing depends entirely upon proper temperature and time, arrangement of parts within container and kind of carburizer. He declared that the results obtained establish the fact that uniform carburizing can be achieved practically only by conducting the cementation process in a manner that permits the reaction between iron and carbon monoxide to take place under favorable and chemically correct conditions which include uniform grain structure of material which is produced by heat treatment, clean surfaces, free from scale, grease, etc., arrangement of work so as to expose all surfaces uniformly to the carburizing gas, a container so sealed that a positive pressure is maintained while carburizing, a uniform temperature above the upper critical temperature and for partial cementation the use of solid copper protecting equipment in preference to any of the present methods, including copper plating. In conclusion, the author said that irregularity in carburizing results can in practically all cases be traced back to the omission of a necessary step or a short cut in conducting the process and that steel made by ordinary steel-making methods will respond satisfactorily to cementation.

Discussion: The paper brought out considerable discussion. Samuel Epstein, associate physicist, Bureau of Standards, in a written discussion, said that the paper was a plea for great care in carburizing and for thorough methods based on scientific study to replace more or less antiquated practice. However, on the subject of normal and abnormal steel the author had stepped on disputed ground. It was probably true, as the author stated, that irregular case hardening and the ensuing soft spots are more largely due to shortcomings in the carburizing and hardening operations than to abnormality of the steel. However, the responsibility for the results obtained in carburizing ought to rest largely, if not entirely, on the carburizer and should not be shifted to the steel maker. The carburizer can not afford to neglect the factor of abnormal steel as the author of the paper stated. The

(Continued on page 822)

Foundrymen to Meet at Syracuse

Five-Day Convention Arranged in 16 Sessions Will
Take Place Oct. 5-9—Large Number of
Manufacturers to Exhibit Products

THE American Foundrymen's Association has arranged an unusually important program of subjects to be discussed at its annual convention to be held at Syracuse, N. Y., beginning Monday, Oct. 5 and concluding with a morning session Friday, Oct. 9. The program is in 16 sessions and covers all phases of the casting of metals. In addition there will be a comprehensive exhibit of products used by foundrymen.

Details of the technical sessions have been given in these pages. The non-ferrous sessions will be under the auspices of the Institute of Metals Division of the American Institute of Mining and Metallurgical Engineers. The annual exchange paper of the British Cast Iron Research Association will be submitted by J. E. Fletcher, whose subject is "Some Inter-relationships in Cast Iron, Wrought Iron and Steel Practice."

Exhibitors with Products to Be Shown at Syracuse

A

- ADAMS Co.**, Dubuque, Iowa. Booth 141. Adams jolt squeezers, 12 to 36-in.; Adams jolt squeezers, 10 to 32-in.; Adams pneumatic sand riddle; Adams cherry snap flasks; Adams steel jackets; miscellaneous Adams foundry equipment. Represented by W. J. Spensley.
- ADVANCE MILLING Co.**, Chicago. Booth 289. Cereal core binder with display of cores. Represented by D. T. McGrory.
- AIR REDUCTION SALES Co.**, New York. Booths 234, 236. Airco oxygen and acetylene cylinders; Airco Davis Bournonville hand welding and cutting apparatus; Airco Davis Bournonville radiograph. Represented by H. K. Koerner and H. P. Lindholm, in the Buffalo district; P. B. Cowell, New York district.
- AJAX METAL Co.**, Philadelphia. Booths 1, 2, 3. Ajax process brass and bronze ingots; castings made from these ingots; Ajax-Wyatt electric furnace for non-ferrous melting; Ajax-Northrup electric furnace. Represented by G. H. Clamer, president and general manager; Frank M. Willeson, New England representative; Zeno D. Barnes, Cleveland representative; William Adams, electric furnace representative; Henry Gieseke, electric furnace representative; Dudley Wilcox, secretary and sales manager Ajax Electrothermic Corporation, Trenton, N. J.
- ALBANY SAND & SUPPLY Co.**, Albany, N. Y. Booth 206. Samples of different grades of sand. Represented by Mr. Murray, Mr. Slater, Mr. Palmer.
- AMERICAN BRAKE SHOE & FOUNDRY Co.**, Chicago. Booth 284. Open and bottom annealing pots, plates and stools for annealing oven use; grizzly disks. Represented by W. S. Cumming, R. S. Stewart, sales department; George H. Rolinson, superintendent Melrose Park plant; C. P. Wright, vice-president.
- AMERICAN ENGINEERING Co.**, Philadelphia. Booths 12, 14, 16. One-ton class A Lo-hed for all around duty; two-ton class B Lo-hed, hand geared trolley type, equipped with alternating current foundry control; two-ton class B Lo-hed, motor trolley type equipped with direct current foundry control; also three-ton class H Lo-hed, plain trolley type. Represented by A. E. Martell, sales engineer.
- AMERICAN FOUNDRY EQUIPMENT Co.**, New York. Booths 48 to 54, 133 to 137. Sand cutting machines of various types, sand blast equipment, aluminum tapered snap flasks, pattern mounting compound, hammer core machines, etc. Represented by Verne E. Minich, president; Elmer A. Rich, Jr., vice-president; James Rigby, sales manager; J. D. Alexander, C. L. Benham, Hutton H. Haley, F. A. Smith, P. S. Weiner and D. Logan, sales engineers.
- AMERICAN VENT WAX Co.**, Lockport, N. Y. Booth 102. Spools of various sizes of American brand vent wax; cores in which this vent wax has been used; both round and flat oval vent wax will be shown, ranging in size from 1/32 in. to 1/2 in. diameter. Represented by Nelson L. Nankey, Charles J. Seibold.
- AMES SHOVEL & TOOL Co.**, Boston. Booth 249. Molder shovels in various types of construction, equipped with various types of handles; scoops used generally around the foundries. Represented by Edwin T. Nipher, man-

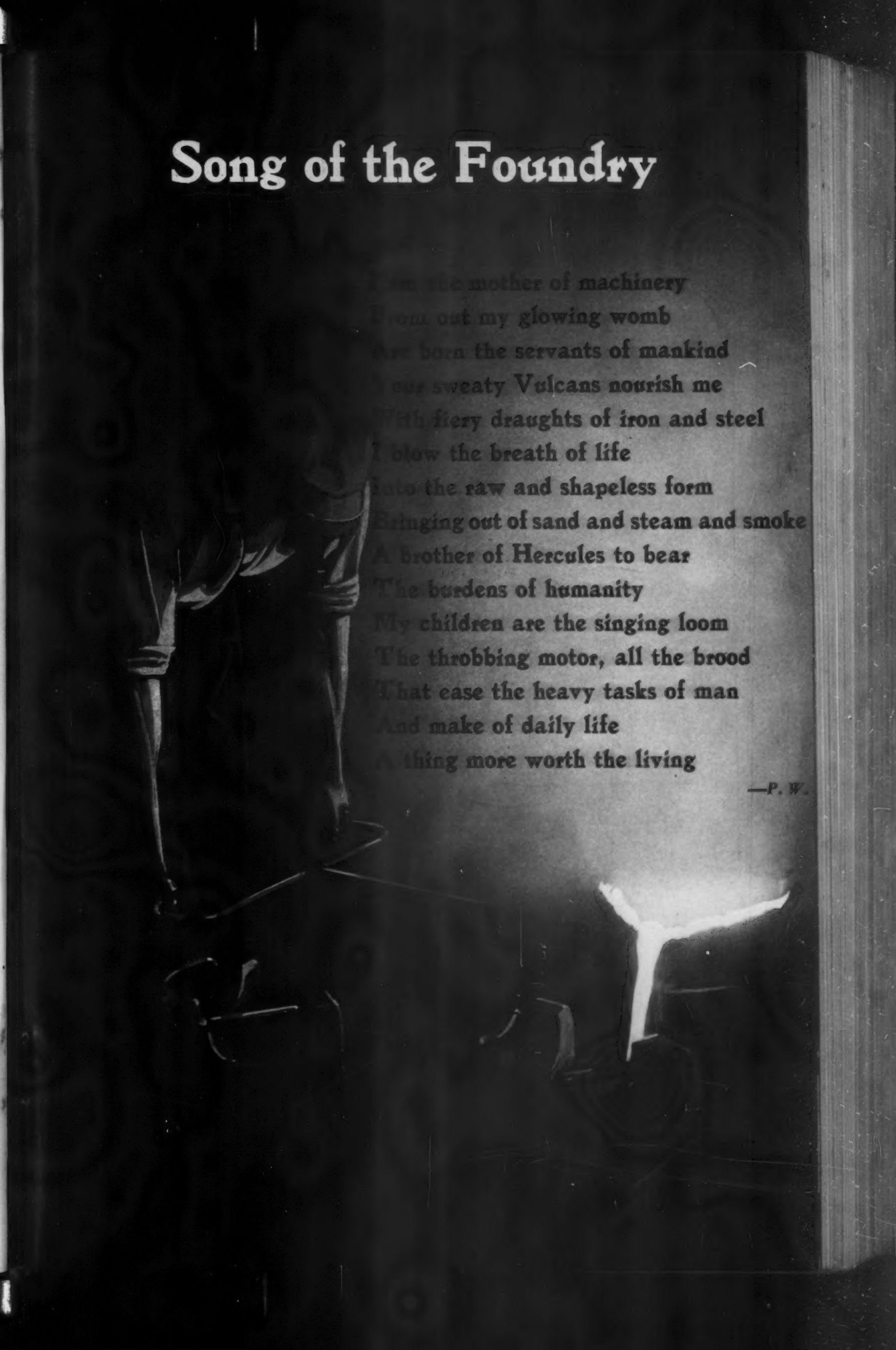
- ager Wright Shovel Co.; Joseph T. Hughes, representative; Walter H. Jenks, assistant to president.
- ARCADE MFG. Co.**, Freeport, Ill. Booths 237, 239, 241. Modern molding machines, jolt squeezer, portable jolt squeezer, jolt stripper, squeezer, sand blast, pouring device. Represented by L. L. Munn, vice-president; Henry Tscherning, chief engineer; V. S. Firestone, assistant engineer; Mentor Wheat, sales department; August Christen, sales department; G. D. Wolfley, Herman Kasten and R. E. Turnbull, sales department.
- ARMSTRONG-BLUM MFG. Co.**, Chicago. Booths 4, 5. Marvel metal band saw; automatic high-speed saw; hack saw machines; punching, shearing and bending machine. Represented by Harry J. Blum, secretary.
- ASBURY GRAPHITE MILLS**, Asbury, N. J. Booth 292. Samples of crude graphite as taken from mines in different parts of the world; also samples of refined graphite suitable for the manufacture of crucibles, lubricants, electrical lines, paint, and all grades of East India silver lead and core wash for foundry facing. Represented by H. M. Riddle, president; H. M. Riddle, Jr., treasurer; Jonathan Bartley, vice-president; Walter Field and A. W. McKnight, graphite engineers.
- E. C. ATKINS & Co.**, Indianapolis. Booth 265. No. 3 metal band saw machine, No. 18 Kwik-kut machine and also No. 7 in operation, Silver Steel power hack saw blades used on both No. 7 and No. 18 machines, hack saw frames, circular metal saws, hack saw blades, Cantol belt wax, grinding wheels, machine knives, hand saws, etc. Represented by E. S. Norvell, manager metal cutting department; H. L. Pruner, district metal saw specialist; W. L. Sturtevant, New York State representative.
- AUSTIN Co.**, Cleveland. Booth 179. Modern foundry practice as regards layouts, equipment and buildings, shown by photographic display, models and other illustrations of the company's complete foundry service, including engineering and construction. Represented by G. A. Bryant, Jr., vice-president and general manager; C. F. Chard, district sales manager; H. E. Stitt, chief engineer; O. D. Conover, foundry specialist; E. F. Scott, foundry engineer.
- AUTO TRUCK INDUSTRIAL APPLIANCES, INC.**, New York. New "Atia" auto truck derrick, mounted directly on chassis, for handling loose materials or heavy solid objects. Represented by George M. Streat, William S. Howard, Thomas MacNearney.
- AYERS MINERAL Co.**, Zanesville, Ohio. Booth 371.

B

- C. O. BARTLETT & SNOW Co.**, Cleveland. Booth 186. Mechanical sand handling equipment, continuous molding equipment and mechanical carrying equipment. Represented by H. L. McKinnon, secretary; M. E. First, chief engineer; S. Gertz and H. C. Orr.
- H. L. BAUMGARDNER CORPORATION**, Chicago. Booths 340, 341.
- BEARDSLEY & PIPER Co.**, Chicago. Booths 83 to 88. Portable and tractor type sandlingers in operation. Represented by E. O. Beardsley, president; W. F. Piper, secre-

(Continued on page 819)

Song of the Foundry



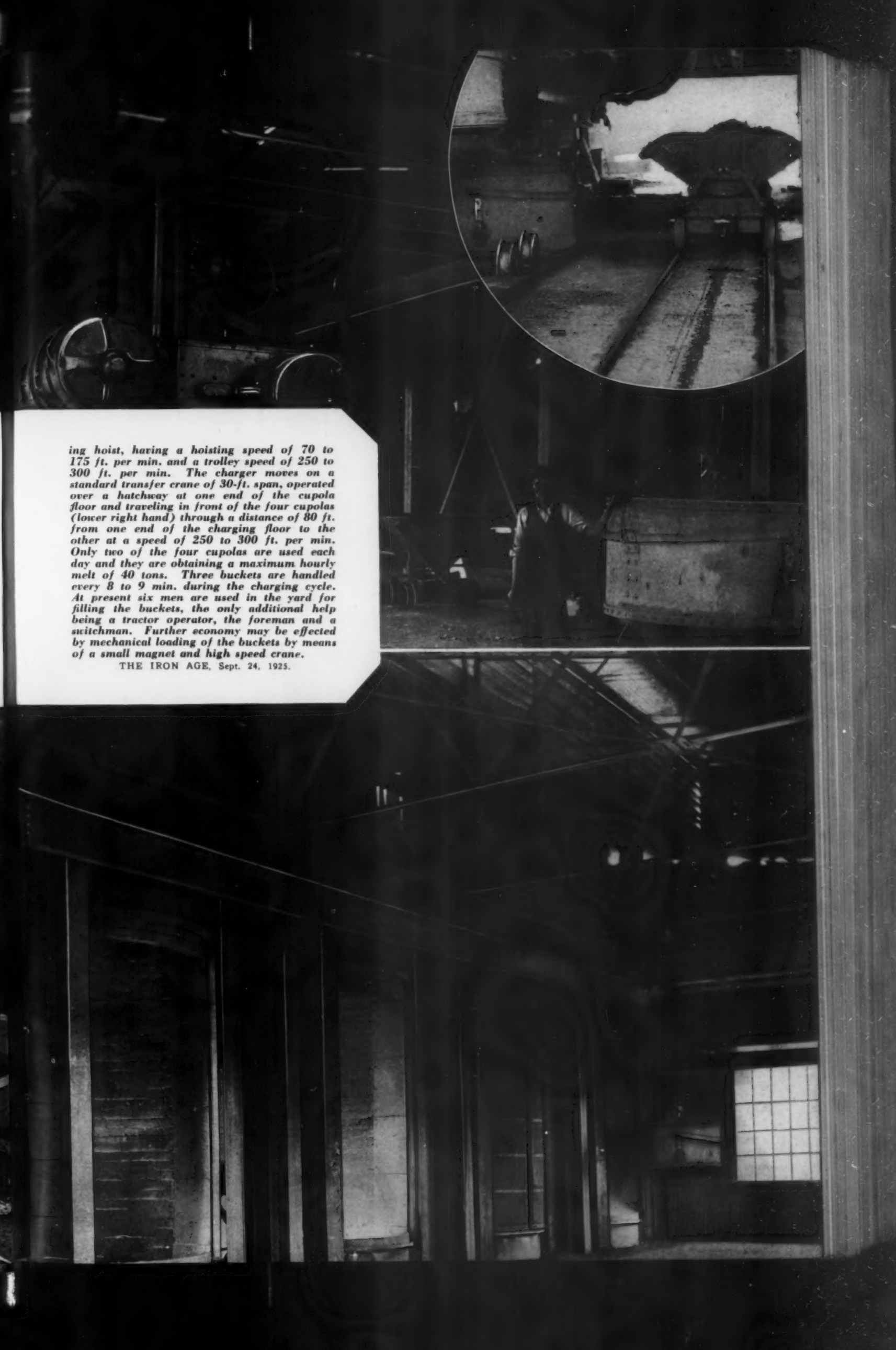
I am the mother of machinery
From out my glowing womb
Are born the servants of mankind
Our sweaty Vulcans nourish me
With fiery draughts of iron and steel
I blow the breath of life
Into the raw and shapeless form
Bringing out of sand and steam and smoke
A brother of Hercules to bear
The burdens of humanity
My children are the singing loom
The throbbing motor, all the brood
That ease the heavy tasks of man
And make of daily life
A thing more worth the living

—P. W.



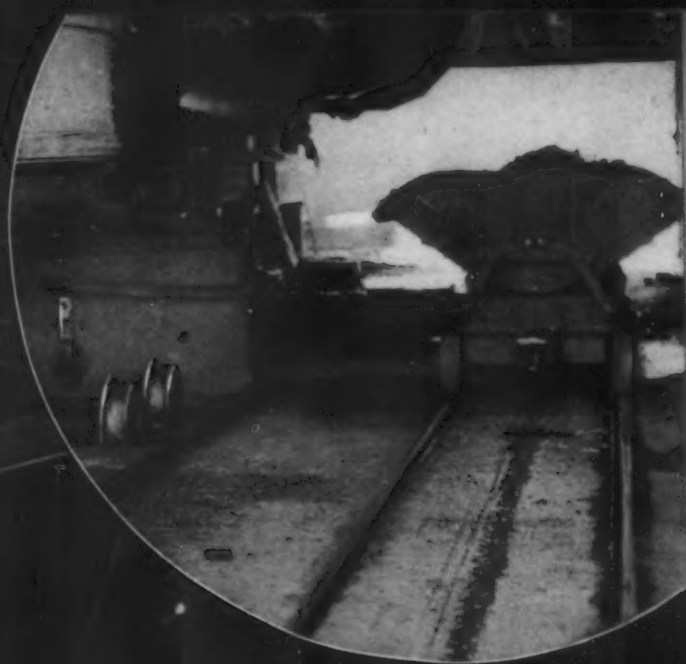
M ECHANICAL cupola charging in the foundry of the Lynchburg Foundry Co., Lynchburg, Va., has decreased coke consumption and has saved the work of 10 men, eight on the charging floor and two in the yard. Coke is delivered in box cars on an elevated track (upper left), then shoveled into the coke storage hopper. Pig iron and scrap are unloaded from gondola cars by locomotive cranes. The inset at the left shows a workman about to charge the buckets with coke. These buckets are of steel, bottom dump type, 5 ft. in diameter by 3 ft. high and are operated in batteries of three each by tractor. Buckets (lower left) completely loaded with 400 lb. of coke, 60 lb. of limestone, 3000 lb. of pig iron and 1000 lb. of scrap, are being weighed. At the upper right the small illustration shows the loaded buckets in the cupola house, while the larger shows the 3-ton cupola charg-

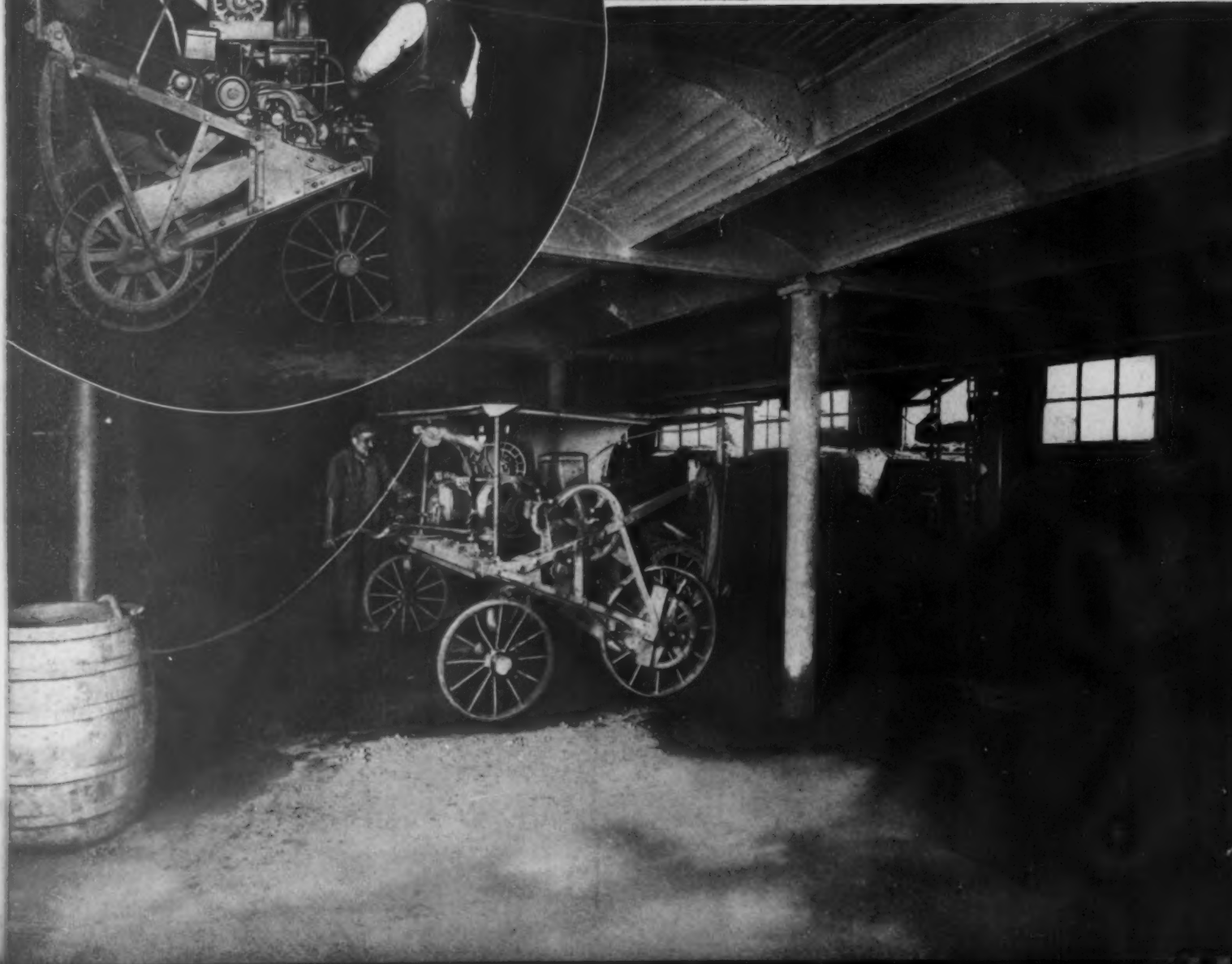
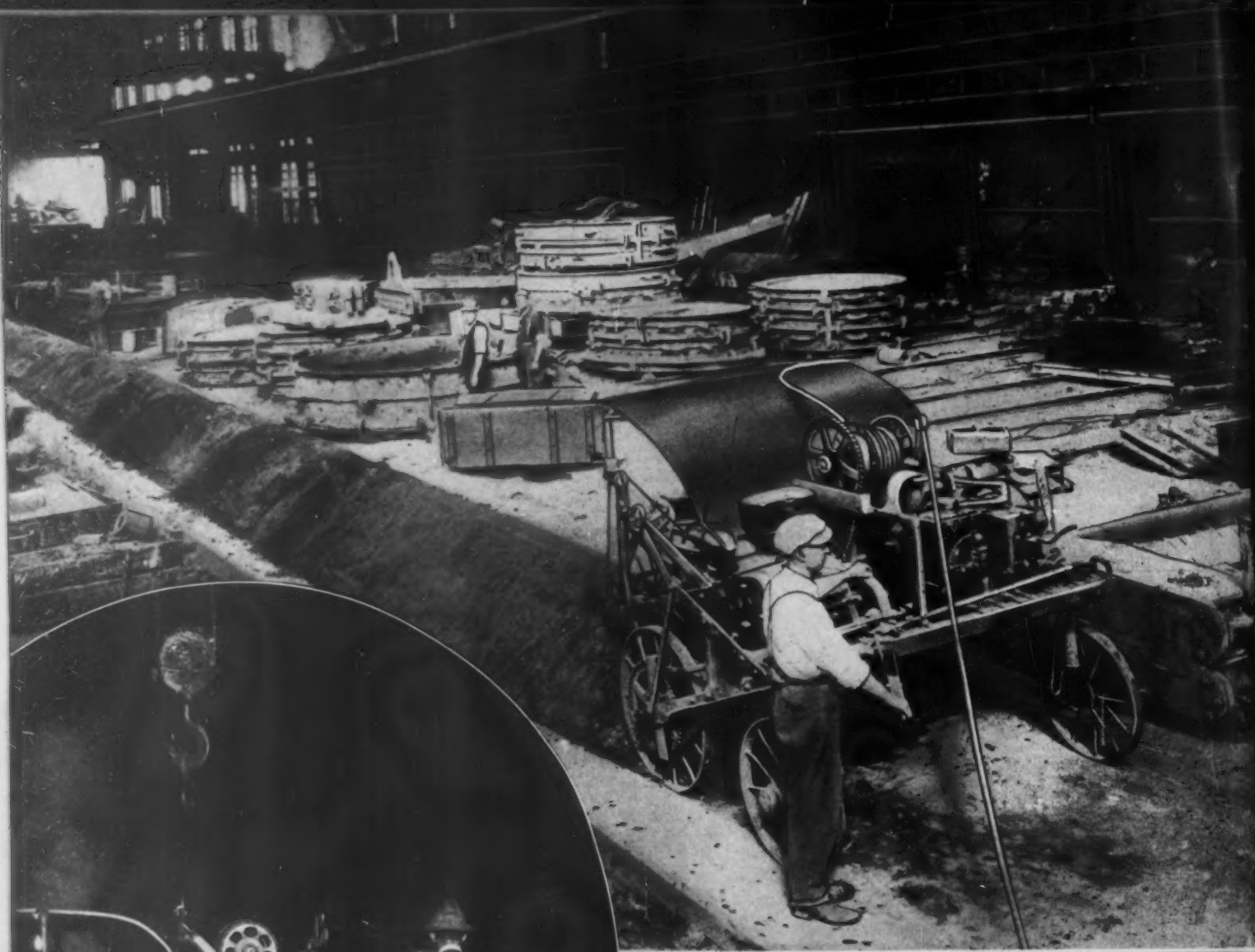


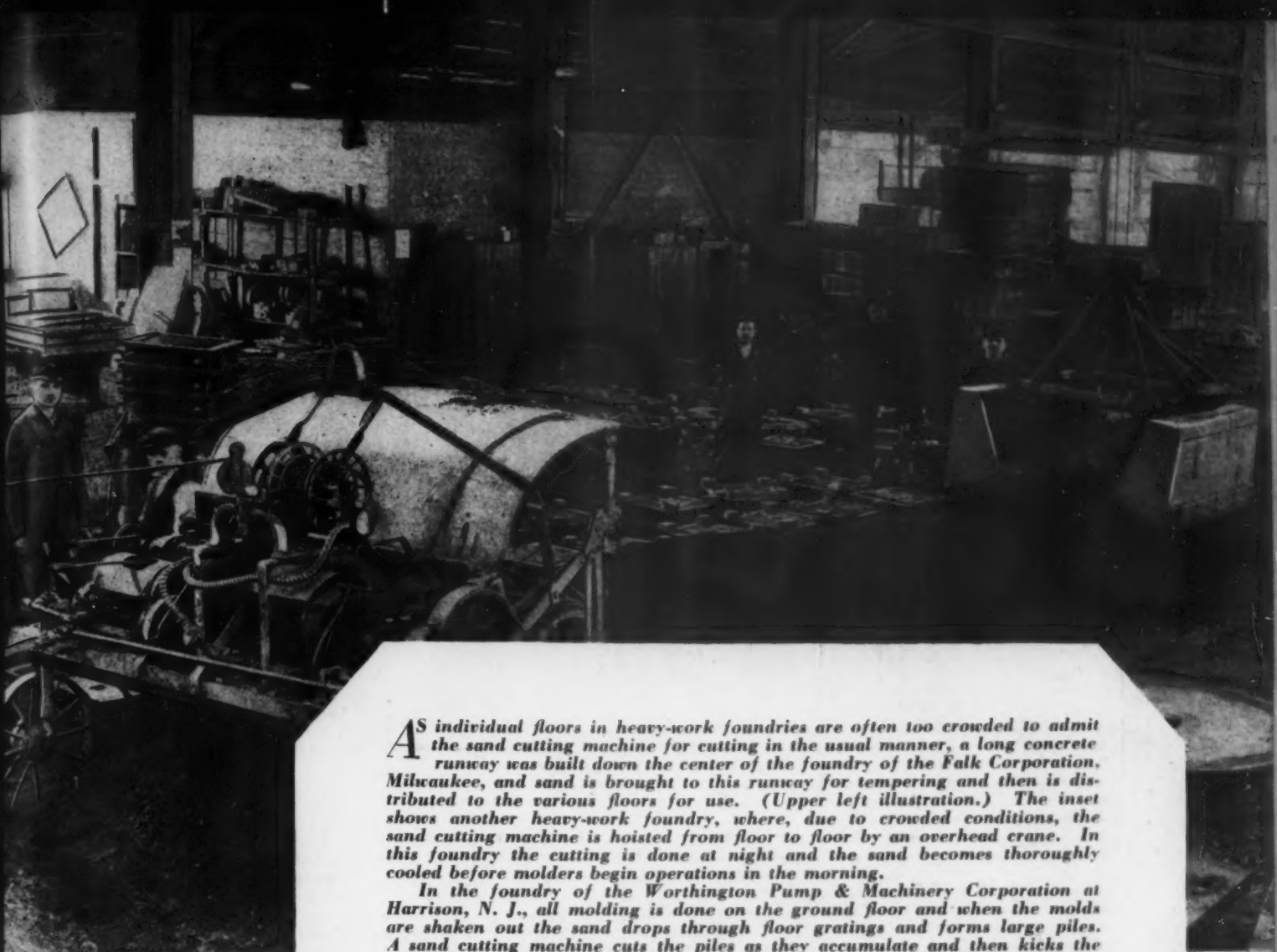


ing hoist, having a hoisting speed of 70 to 175 ft. per min. and a trolley speed of 250 to 300 ft. per min. The charger moves on a standard transfer crane of 30-ft. span, operated over a hatchway at one end of the cupola floor and traveling in front of the four cupolas (lower right hand) through a distance of 80 ft. from one end of the charging floor to the other at a speed of 250 to 300 ft. per min. Only two of the four cupolas are used each day and they are obtaining a maximum hourly melt of 40 tons. Three buckets are handled every 8 to 9 min. during the charging cycle. At present six men are used in the yard for filling the buckets, the only additional help being a tractor operator, the foreman and a switchman. Further economy may be effected by mechanical loading of the buckets by means of a small magnet and high speed crane.

THE IRON AGE, Sept. 24, 1925.








AS individual floors in heavy-work foundries are often too crowded to admit the sand cutting machine for cutting in the usual manner, a long concrete runway was built down the center of the foundry of the Falk Corporation, Milwaukee, and sand is brought to this runway for tempering and then is distributed to the various floors for use. (Upper left illustration.) The inset shows another heavy-work foundry, where, due to crowded conditions, the sand cutting machine is hoisted from floor to floor by an overhead crane. In this foundry the cutting is done at night and the sand becomes thoroughly cooled before molders begin operations in the morning.

In the foundry of the Worthington Pump & Machinery Corporation at Harrison, N. J., all molding is done on the ground floor and when the molds are shaken out the sand drops through floor gratings and forms large piles. A sand cutting machine cuts the piles as they accumulate and then kicks the sand back against the wall, where it is picked up by elevator buckets and carried to the molding floor. This foundry is operated on the continuous pouring plan, and the sand cutting machine is used all day long, but without interfering with molding operations.

In the upper right illustration is shown the floor of the Superior Steel Castings Co.'s foundry at Benton Harbor, Mich. Here the sand is picked up by a grab bucket after it has been shaken out of the molds and is carried to one long pile in the center of the floor, where the sand cutting machine does its work.

Molding sand is unloaded by gantry crane into the hatches of sand storage bins at the steel foundry of the Bucyrus Co., South Milwaukee. (Lower right illustration.) The bins, which are of concrete and extend 12 ft. below the floor level of the foundry, have a total capacity of 6000 tons.

THE IRON AGE, Sept. 24, 1925.



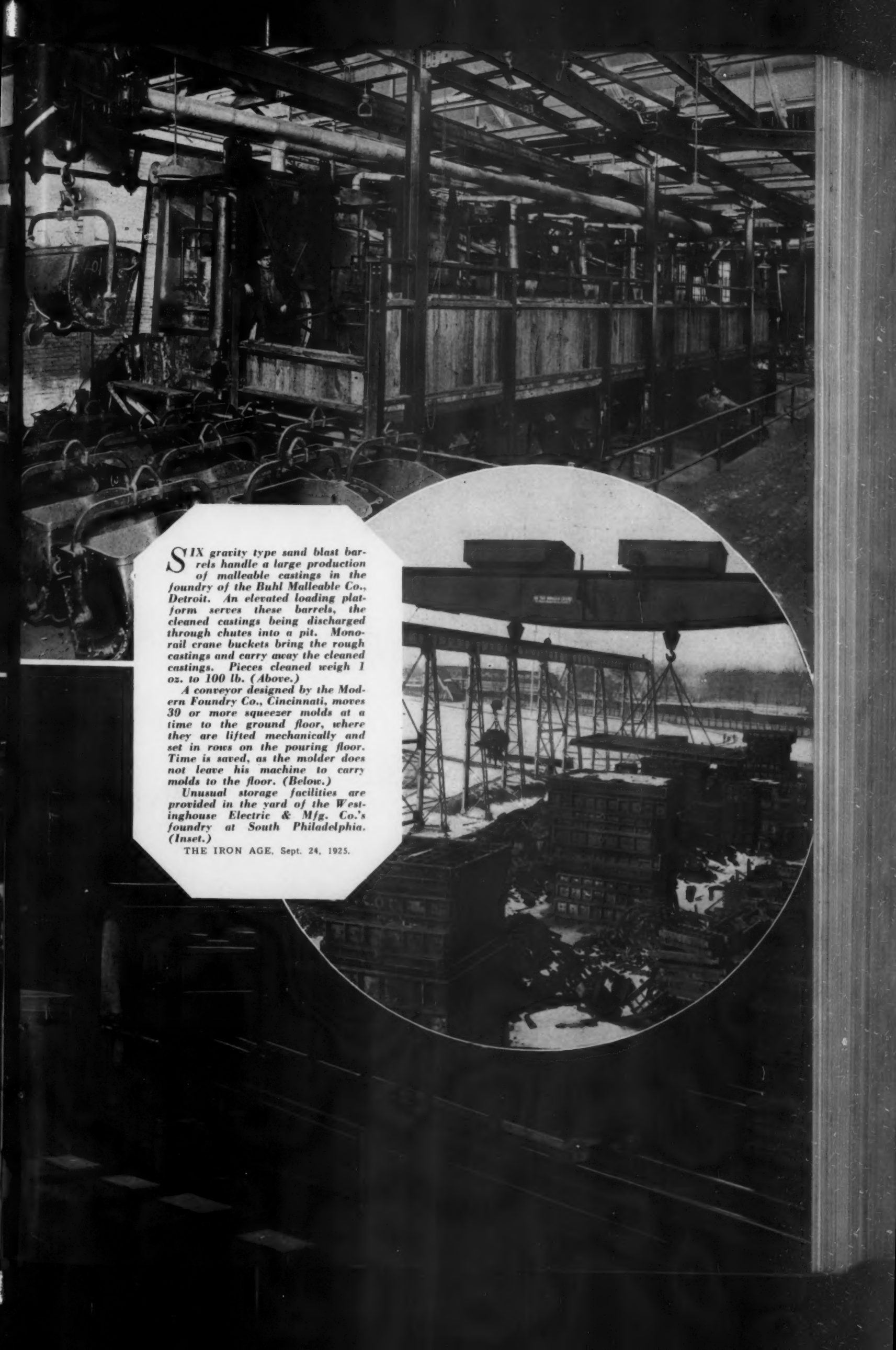


THE Ferro Machine & Foundry Co., Cleveland, saves money by using two double-end core ovens which permit loading cores on one end without interfering with unloading on the other. Each oven is 3 ft. x 7 ft. with three 13-in. drawers. (Above.)

At the same plant, a chute delivers cores to the core finishing room on the floor below. The cores pass from the unloading side of the ovens to roller tables for finishing. (Below.)

Molds for planers at the G. A. Gray Co.'s foundry, Cincinnati, are made in a pit to insure rigid support. A mold for a 24-in. planer is shown being built up. By using unit cores the same core boxes may be used for any length of bed. (Inset.)

THE IRON AGE, Sept. 24, 1925.



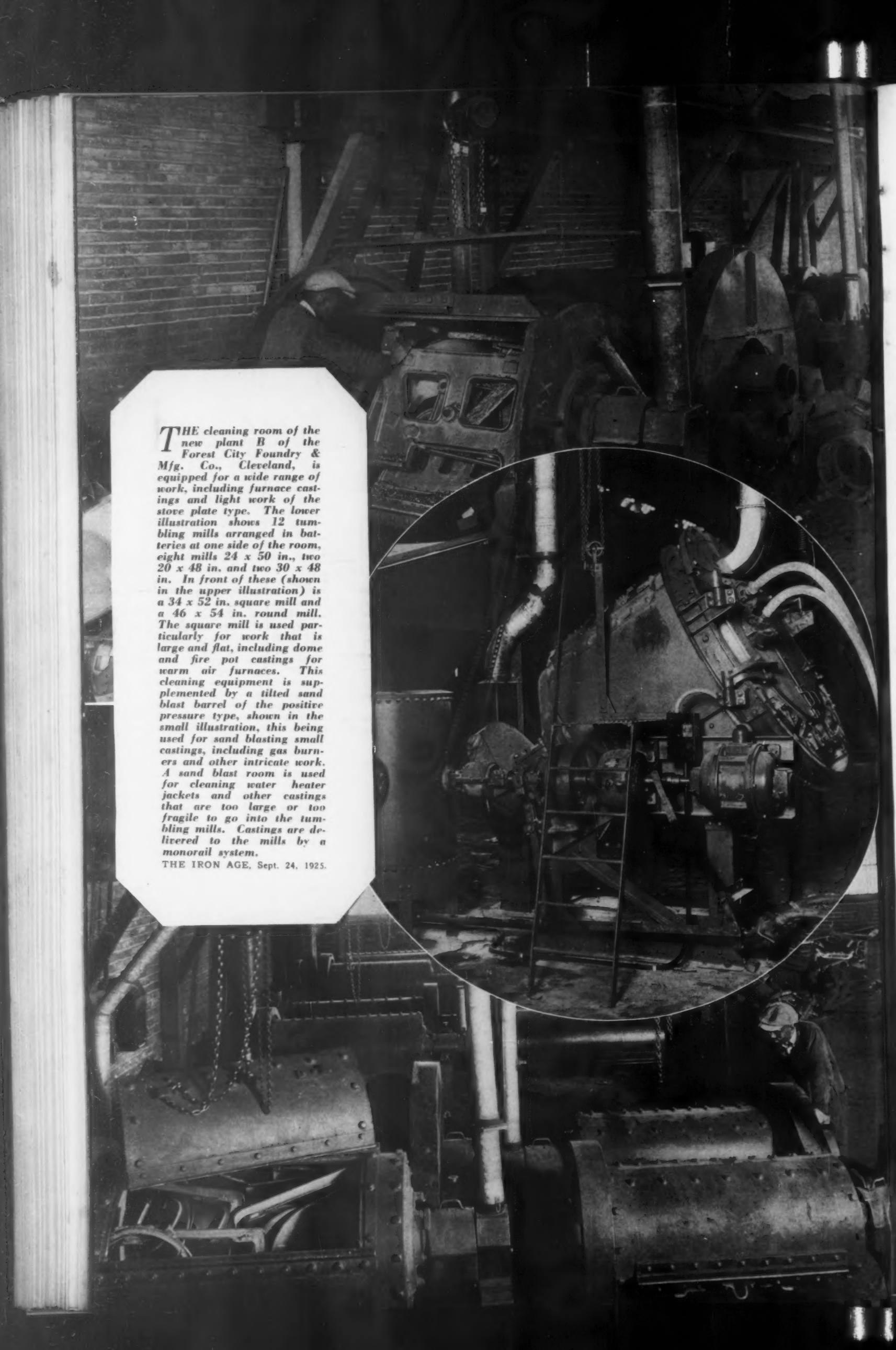
SIX gravity type sand blast barrels handle a large production of malleable castings in the foundry of the Buhl Malleable Co., Detroit. An elevated loading platform serves these barrels, the cleaned castings being discharged through chutes into a pit. Mono-rail crane buckets bring the rough castings and carry away the cleaned castings. Pieces cleaned weigh 1 oz. to 100 lb. (Above.)

A conveyor designed by the Modern Foundry Co., Cincinnati, moves 30 or more squeezer molds at a time to the ground floor, where they are lifted mechanically and set in rows on the pouring floor. Time is saved, as the molder does not leave his machine to carry molds to the floor. (Below.)

Unusual storage facilities are provided in the yard of the Westinghouse Electric & Mfg. Co.'s foundry at South Philadelphia. (Inset.)

THE IRON AGE, Sept. 24, 1925.





THE cleaning room of the new plant B of the Forest City Foundry & Mfg. Co., Cleveland, is equipped for a wide range of work, including furnace castings and light work of the stove plate type. The lower illustration shows 12 tumbling mills arranged in batteries at one side of the room, eight mills 24 x 50 in., two 20 x 48 in. and two 30 x 48 in. In front of these (shown in the upper illustration) is a 34 x 52 in. square mill and a 46 x 54 in. round mill. The square mill is used particularly for work that is large and flat, including dome and fire pot castings for warm air furnaces. This cleaning equipment is supplemented by a tilted sand blast barrel of the positive pressure type, shown in the small illustration, this being used for sand blasting small castings, including gas burners and other intricate work. A sand blast room is used for cleaning water heater jackets and other castings that are too large or too fragile to go into the tumbling mills. Castings are delivered to the mills by a monorail system.

THE IRON AGE, Sept. 24, 1925.

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- tary; George Furman, sales manager; H. G. Schlichter, C. H. Ellis, E. L. Mitchell, Edward O'Connor, J. S. Sammons, sales engineers; Pete Stefan and H. Lind, demonstrators; W. E. Naylor, chief engineer; F. M. Christophersen, assistant sales manager.
- CHARLES H. BESLY & Co.**, Chicago. Booth 244. A 53-in. wet motor driven vertical spindle disk grinder and a No. 51 motor driven disk grinder with power actuated oscillating tables; display of Besly titan spiral abrasive disks. Represented by Edward P. Welles, C. A. Knill, E. L. Belsel, R. E. Belmer, J. F. Curns, A. J. Doermann.
- BETHLEHEM STEEL Co.**, Bethlehem, Pa. Booth 397. Mayari iron and castings made from iron containing an admixture of Mayari iron. Represented by D. A. Barkley, sales agent pig iron, coke and by-products; R. A. MacDonald, foundry specialist; Pete Kreulin, foundry specialist; F. E. Fisher, salesman, St. Louis; A. D. Smith, salesman, Cleveland; T. G. Cox, salesman, Boston; George A. Richardson, manager technical publicity department in charge of exhibit.
- BLYSTONE MFG. Co.**, Cambridge Springs, Pa. Booth 210. Blystone No. 1 with screen. Represented by L. G. Conroe, general manager; C. E. McKinney, sales manager.
- BRADLEY WASHFOUNTAIN Co.**, New York. Booth 188. A 54-in. colored Marmorite, type A, washfountain. Represented by A. C. Cooper.
- BRIDGEPORT SAFETY EMERY WHEEL Co.**, Bridgeport, Conn. Booths 8, 10. No. 174 radial swing frame grinder; motor driven floor grinder; belt driven floor grinder. Represented by H. H. Peck, superintendent; I. L. Burritt.
- BRITISH ALUMINUM Co., LTD.**, New York. Booth 123. Aluminum ingot in varying grades of purity, also alloys; various forms of extruded and drawn molding, wire, etc., and a series of samples showing the raw material from which aluminum is made. Represented by Ernest V. Pannell, Arthur Jellinek.
- C**
- CALIFORNIA WHITE & SUGAR PINE MANUFACTURERS' ASSOCIATION**, San Francisco. Booth 369. Samples of California sugar pine for foundry patterns. Exhibit in charge of a wood technologist.
- CAMPBELL-HAUSFELD Co.**, Harrison, Ohio. Booth 38. Hausfeld metal melting furnaces, non-crucible type, tilting type crucible furnaces and stationary type crucible furnaces, tilting type furnaces for melting aluminum using cast-iron melting pot, also stationary type, motor driven oil pumps, motor driven blowers, etc. Represented by Edward B. Hausfeld, secretary; J. S. Armour, sales manager.
- CARBORUNDUM Co.**, Niagara Falls, N. Y. Booths 294, 295. Carborundum and Aloxit grinding wheels; Carborundum and Aloxit grains; Carborundum and Aloxit disks; Carborundum refractories. Represented by W. W. Sanderson, general sales manager; C. E. Hawke, S. A. Fenno, refractory disks, Perth Amboy, N. J.; sales representatives from Pittsburgh, Cincinnati, Milwaukee, Philadelphia.
- CARTER BLOXONEND FLOORING Co.**, Kansas City, Mo. Booth 358. Flooring panel made up from standard 8-ft. lengths of Bloxonend flooring; illustrating the lateral nailing method for installing Bloxonend flooring in industrial plants. Represented by J. G. Galvin, advertising manager; L. L. Bucklew, manager Cleveland office; A. E. Glese, manager Chicago office; S. F. Bridges, representative, Kansas City, Mo.
- FRANK D. CHASE, INC.**, Chicago. Booths 185, 187. Engineering plans, photographs, departmental arrangements, plant exhibition layouts. Represented by Frank D. Chase, president; M. L. Pereira, vice-president; C. R. Cady, foundry engineer; L. J. Chase, production engineer.
- THOMAS E. COALE LUMBER Co.** Booths 424, 425. Samples of pattern lumber.
- CHICAGO CRUCIBLE Co.**, Chicago. Booth 359. Graphite crucibles and refractories, including stirrers, skimmers, brazers, retorts, etc.; also Cupalloy, a process for alloying gray iron in the cupola, along with iron castings made of alloyed iron. Represented by A. F. Hottinger, president; J. P. Foraker, vice-president; W. MacFadden, vice-president; H. C. Sorenson, district manager; J. G. Crowe, representative; J. W. Mann, service engineer; L. Knecht, superintendent.
- CHICAGO PNEUMATIC TOOL Co.**, New York. Booths 61, 63, 65. 12 x 7 x 10 compound tandem compressor with

motor built in flywheel; pneumatic bench and floor sand rammers, Super and Keller chipping hammers, riveting hammers, core breakers, automatic oilers for sand rammers, pneumatic air grinders, air drills, hoists, Pedwyn balancers, accessories, portable electric grinders and drills. Represented by A. E. Goodhue, vice-president; N. B. Gatch, assistant vice-president; W. C. Straub, New York district manager; A. C. Andresen, special pneumatic representative; A. M. Brown, manager Philadelphia office; R. F. Eisler, manager Pittsburgh office; J. L. Westenhaver, manager Cleveland branch; G. C. VandenBoom, manager Chicago office; J. W. McCabe, manager St. Louis office; T. G. Smallwood, manager Cincinnati office; H. G. Spinks, Syracuse salesman.

CHISHOLM-MOORE MFG. Co., Cleveland. Booth 262. Extended hand wheel trolley chain hoist with bull ladle; electric hoist with flask. Several parts of above to demonstrate with; and working model of Cyclone chain hoist. Represented by E. S. Ludlow.

CLARK TRACTOR Co., Buchanan, Mich. Booths, 80, 82. Five gasoline-propelled industrial haulage vehicles as follows: Two-ton automatic dump tractor with 30 cu. ft. body and one-ton auto dump tractor with 24 cu. ft. body; Clark Truclift, three-ton elevating platform truck; flat auto dump tractor with 24 cu. ft. body; also Duat, a small industrial tractor. Represented by G. M. Chase, manager Rochester office; M. L. Hanlin, vice-president at Buchanan; R. W. Pears, manager Buffalo office; Ezra W. Clark, advertising manager.

CLEVELAND PNEUMATIC TOOL Co., Cleveland. Booths 212, 214. A complete line of foundry air tools, such as sand rammer for floor flask bench and core ramming; portable pneumatic grinders for cleaning castings; core breakers, chipping and sand hammers, air drills in 20 sizes; holders-on, riveting hammers, hammers for cleaning manganese rolls, rammers for cupola and slag tools; Bowes couplings, air valves, etc. Represented by H. S. Covey, secretary and sales manager; Arthur Scott, general superintendent; J. T. Graves, representative; R. E. Manning, manager Pittsburgh branch office; R. H. Rockefeller, manager New York City branch; J. A. Dockery, manager Boston branch office; J. DeMooy, assistant sales manager.

CLIPPER BELT LACER Co., Grand Rapids, Mich. Booth 103. The complete Clipper line consisting of four models of Clipper belt lacers, the various sizes of belt hooks, two models of belt cutters with safety feature and the Clipper connecting pins, including the new Clipper special pin; also an electrically operated moving belt display. Represented by John Jepson, factory representative.

F. A. COLEMAN Co., Cleveland. Booths 58, 60. Electrically heated rolling drawer core oven in operation. Represented by F. A. Coleman, president and general manager.

COMBINED SUPPLY & EQUIPMENT Co., INC., Buffalo. Booth 56. Angle Stem chaplets; Double Angle chaplets; Bowers paste gun for spreading paste on cores and joints of dry sand molds. Represented by Stephen LeViness, Jr., president; C. L. Jackson, vice-president; Edward Bowers, salesman.

CORN PRODUCTS REFINING Co., New York. Booth 288. Kordek as a corebinder using an electric oven. Represented by S. B. Krantz, representative; Frank G. Fallier, Jr., Horace D. Farris, Joseph M. Remmes, Albert H. Kreischer, salesmen.

D

DAVENPORT MACHINE & FOUNDRY Co., Davenport, Iowa. Booths 240, 242. Photographs of machines, installations and castings. Represented by Carl Falk, special representative; Robert Larkin, service man; Art Ziebarth, manager molding machine department.

WILLIAM DEMMLER & BROTHERS, Kewanee, Ill. Booths 243, 245. Several core machines in operation. Represented by H. L. Demmler, F. A. Demmler.

DETROIT ELECTRIC FURNACE Co., Detroit. Booths 97, 99. L. F. S., 100 kw. Detroit electric furnace; samples of material produced in Detroit furnaces. Represented by Edward L. Crosby, president and general manager; A. E. Rhoads, L. B. Barker, sales engineers; F. P. Weaver, production engineer.

HENRY DISTON & SONS, INC., Tacony, Philadelphia. Booth 192. Inserted tooth and solid tooth metal cutting saws; metal cutting products such as milling saws, metal sliding saws, hack saw blades, etc. Represented by S. Horace Diston, vice-president; D. W. Jenkins, general manager, domestic division; J. C. Forrest, manager metal saw sales; J. L. Dorrington, salesman; E. J. Ludy, demonstrator.

JOSEPH DIXON CRUCIBLE Co., Jersey City, N. J. Booth 402. Graphite crucibles, assay sand crucibles, graphite re-torts, stoppers, nozzles, sleeves, welding rods, plates, putty. Represented by R. R. Belleville, Philadelphia; R. H. Brinkerhoff, Eastern territory; F. R. Brandon, Chicago territory; J. A. Condit, New York State; A. L. Haasis, sales manager, Jersey City; R. F. Leonard, New Jersey; C. A. Shaw, Boston territory; J. E. Schultz, Metropolitan; E. A. St. John, Western territory; J. E. Thomas, Pittsburgh.

DOCK & MILL Co., North Tonawanda, N. Y. Booth 391. White pine lumber in 4/4, 5/4, 8/4, 10/4, 12/4, 16/4 thicknesses; a big soft textured white pine saw log showing how the saw goes through the log in sawing pattern, flask and templet lumber. Represented by Elmer J. Semon, J. D. Pierce, Walter M. Nautk.

E

ELECTRIC FURNACE Co., Salem, Ohio. Booth 121. T-Grid electric furnaces for heat treating, annealing, carburizing, enameling. Electric heating equipment for special processes. Will show sample construction of large furnaces, views of installations, data on operation, etc. Represented by R. F. Benzinger, vice-president and sales manager; A. H. Vaughan, advertising manager; F. T. Cope, chief engineer; F. J. Peterson, Detroit representative; O. J. AbeH, Chicago representative.

ELWELL-PARKER ELECTRIC Co., Cleveland. Booth 13. Elwell-Parker electric portable crane, electric furnace charger and electric elevator "tractor." Represented by L. C. Brown, vice-president and general sales agent; G. W. Brown, general sales agent; C. E. Cochran, chief engineer; C. B. Cook, sales manager; Ray Smith, district sales engineer; W. C. Kershaw, service engineer.

F

FANNER MFG. Co., Cleveland. Booths 365, 366. Foundry chaplets, malleable flask trimmings, hard malleable tumbling stars, malleable iron push nipples, tapered radiator plugs, threaded pipe plugs. Represented by J. R. Raible, president; C. G. Raible, vice-president; P. D. McDonnell, superintendent; J. Reyburn, superintendent; E. Durant, assistant superintendent; C. E. Ireland, salesman; F. W. Beck, sales manager.

FEDERAL FOUNDRY SUPPLY Co., Cleveland. Booth 110. Foundry equipment and supplies.

FEDERAL MALLEABLE Co., West Allis, Wis. Booth 250. Rapid molding machines showing rapid plain squeezers and jolt squeezers. Represented by L. C. Wilson, vice-president and general manager; W. J. MacNeill, superintendent; K. H. Siemens.

FOUNDRIES SERVICE CORPORATION, New York. Booth 281. Wood patent process molding machines, two power and one hand. Represented by John R. Wood, inventor; Oliver T. Wood and John J. Lawler.

FOUNDRY EQUIPMENT Co., Cleveland. Booths 246, 248. Core ovens of various types; enlarged photographs of typical installations in representative foundries showing various types of core and mold ovens, core and mold cars, portable core racks, melting furnaces, etc. Represented by C. A. Barnett, vice-president and general manager; H. W. Steindorf, chief engineer; M. A. Beltaire, Jr., representative; C. M. Holcomb, representative.

FOWLER & UNION HORSE NAIL Co., Buffalo. Booth 395. Moldochill nails, used in foundry practice as an internal chill; also samples of castings as made, illustrating proper and improper use. Represented by James Gibney, Jr., metallurgical engineer; Charles A. Reamer, assistant sales manager.

G

J. H. GAUTHIER & Co., Jersey City, N. J. Booth 408. Various sizes of black lead crucibles, refractory and insulating materials, both in standard sizes and special shapes. Represented by Oliver W. Bird, Jr., president; George L. Meade, New England representative.

GENERAL ELECTRIC Co., Schenectady, N. Y. Booths 25, 27, 29. A 6000-cu. ft. 16 oz. centrifugal foundry blower (direct driven by a 40-hp. induction motor); WD-14 portable arc welder with induction motor drive; CO-1820 direct current crane motor; 50-kw. 1200 r.p.m. two unit, three bearing, motor generator.

GLOBE STEEL ABRASIVE Co., Mansfield, Ohio. Booth 98. Globe H. C. chilled shot, Globe cornered steel grit. Represented by C. H. McConnell, manager.

GREAT WESTERN MFG. Co., Leavenworth, Kan. Booth 208. Type V and type CS Combs gyratory foundry riddles. Represented by Charles F. Murphy.

GRIMES MOLDING MACHINE Co., Detroit. Booths 162, 164. Grimes jolt rollover molding machine; Grimes hand rammed rollover molding machine and Grimes jolt stripping plate machine. Represented by George L. Grimes, president and manager; C. J. Skeffington, salesman.

H

BENJAMIN HARRIS & Co., Chicago. Booth 283. Composition ingot, yellow brass ingot, all grades non-ferrous metal scrap. Represented by Nathan Harris, treasurer; Oscar Harris, secretary; Louis Goldman, vice-president; Fred Valbracht, salesman.

R. G. HASKINS Co., Chicago. Booth 125. Flexible shaft equipment for foundry and pattern shop. Represented by R. G. Haskins and L. D. Bowden.

HAYWARD Co., New York. Booths 24, 26. Hayward electric motor clam shell bucket; air-operated orange peel bucket; models of clam shell and orange peel buckets and Hayward electric feeder cable take-up reel. Represented by H. M. Davison, general manager of sales; C. S. Sargent, engineer; H. C. Ryder, salesman.

HERMAN PNEUMATIC MACHINE Co., Pittsburgh. Booths 76, 78, 159, 161. One production type jarr independent rollover and pattern drawing machine. Represented by Thomas Kaveny, president; A. G. Doyle, vice-president; Richard Harris, secretary; Robert F. Ringle, works manager; I. J. Oesterling, assistant works manager; C. W. Miller, R. P. Morgan, W. W. Hughes, C. S. McMath, Robert M. Porteous, L. L. Johnston, service engineers; T. O. Renkenberger, plant engineer; T. A. Plassmyer, assistant plant manager; Alfred Herman, superintendent pattern shop.

HOLCROFT & Co., Detroit. Booth 370. Photographs, drawings and data on heat treating furnaces, melting furnaces and continuous kilns. Represented by C. T. Holcroft, president; H. L. Ritts, secretary-treasurer; A. Ruckstahl, engineer.

HUDSON VALLEY COKE & PRODUCTS CORPORATION, Troy, N. Y. Booths 415, 417. Pig iron and coke. Represented by officers and salesmen of E. Arthur Tutein, Inc., selling representative; also by W. H. Wright, New York; S. O. Hobart, manager, Troy, N. Y.; James A. Burden, Jr., assistant manager, Troy, N. Y.

I

INDEPENDENT PNEUMATIC TOOL Co., Chicago. Booths 258, 260, 261. Thor pneumatic tools and electric drills; Thor foundry hammers; Thor pneumatic motor hoists; Thor portable air grinders; Thor sand rammers. Represented by Adolph Anderson, sales engineer; R. S. Cooper, vice-president and general manager; R. T. Scott, vice-president; H. G. Keller, New York; J. P. Fletcher, Buffalo; G. H. DuSall, Milwaukee; T. J. Clancy, Cleveland; Carl A. Novinger, Detroit; Fred W. Wunder, Pittsburgh; E. F. Furrow, St. Louis; William E. Dougherty, Philadelphia; C. E. Fowler, Toronto, Ont.

INGERSOLL-RAND Co., New York. Booths 220, 226. Sand rammers, pneumatic motor hoists, pneumatic chipping hammers, pneumatic grinders, pneumatic drills, pneumatic riveting hammers and air compressors. Represented by George C. Williams, district manager, Cleveland; George Kehrer, Buffalo; John Green, Boston.

INTERNATIONAL MOLDING MACHINE Co., Chicago. Booths 37, 43. Combination jar ramming power turn-over power draw molding machines; combination jar ramming power turn-over foot draw molding machines; plain power squeezers; combination jar ramming hand turn-over foot draw machines; jarring machines with air lifting cylinders, jolt squeezers, combination jar ramming hand stripping machines; combination jar ramming power stripping machines; jolt squeeze-strip machines; hand ramming hand turn-over foot draw molding machines; two-shaft hand stripping plate machines; core making machines. Represented by Edward A. Pridmore, president; W. W. Miller, vice-president; Carl Levahn, general foreman; E. G. Borgnis, representative; M. J. Monahan, representative; Luke S. Shannon, representative; Hugh Gallagher, representative; W. J. Rowley, representative; W. J. Briggs, Pacific Coast representative; Frank Seider in charge of demonstrations; several molding machine operators.

INTERNATIONAL NICKEL Co., New York. Booths 427, 428. Samples of iron and steel castings containing nickel, together with commercial forms of nickel and of its alloys. Represented by F. S. Jordan, sales manager; R. A. Wheeler, nickel department; W. J. Calnan, monel metal and rolled nickel department; A. J. Wadhams, manager development and research department; P. D. Merica, director of research; T. H. Wickenden, develop-

ment and research department; Charles McKnight, Jr., and J. S. Vanick, development and research department. *The Iron Age*, New York. Booth 367. Represented by W. W. Macon, E. F. Cone, C. E. Wright, G. L. Lacher, R. E. Miller, C. S. Baur, D. C. Warren, B. L. Herman, W. C. Sweetser, C. L. Rice, F. W. Schultz, H. E. Barr, Edgar Sinnock, Charles Lundberg, C. E. Lachaussee.

J

JENNISON-WRIGHT Co., Toledo, Ohio. Booth 368. Kreolite wood block floors; Kreolite insulating compound for marking aiseways on Kreolite block floors; Kreolite industrial track railway ties; Kreolite structural timbers, etc. Represented by T. B. Fogg, industrial railroad ties; F. W. Cherrington, director engineering and sales.

JOHNSTON & JENNINGS Co., Cleveland. Booths 163, 165. Complete line of foundry molding machines and vibrators, including plain squeezers, combination jolt squeezers, jolt squeeze pattern draws, jolt strippers and plain jolt machines in operation. Represented by T. J. Calhoun, vice-president and general manager; J. L. Battenfeld, sales engineer; R. W. Gramling, sales engineer; J. T. Riley, foundry superintendent.

K

CHARLES C. KAWIN Co., Chicago. Booth 350. Space will be devoted to receiving foundrymen by representatives. Represented by Charles C. Kawin, president; J. Tissing, vice-president and secretary; W. H. Griner, representative; James Jordan, representative; W. S. Miller, chemist.

KELJER MECHANICAL ENGINEERING CORPORATION, Brooklyn, N. Y. Booth 95. Type BL Keller, all around die tool and pattern room machine; R-6 Keller cutter and radius grinder improved; BK-3 Keller roller floor stand flexible shaft grinder; BK-1 Keller bench stand flexible shaft grinder. Represented by Jules Dierckx, vice-president and sales manager; Charles Bitter, A. J. Benson, P. Brown.

WILLIAM H. KELLER, INC., Grand Haven, Mich. Booth 238. Full line of pneumatic tools and repair parts. Represented by Daniel Woodhead, general sales manager; E. J. Beiderman, sales staff.

SPENCER KELLOGG & SONS, Buffalo. Booth 400. Core oil, cores and finished castings. Represented by V. A. Acer, director of sales; W. L. Goetz, manager of core oil department; N. J. Yaeger, Chicago representative; E. G. Allen, Cincinnati representative; E. A. Medbery, New York representative; H. J. Strassberger, Buffalo representative; M. A. Agster, chemist.

KNEPETER-BATES MFG. Co., Indianapolis. Booth 107. K-B core binder. Represented by Ernest Knefler, president; George B. Hill, sales manager; Herbert J. Bever, salesman; John A. Green, salesman.

H. KRAMER & Co., Chicago. Booth 361. 88-10-2, 80-10-10, 85-5-5-5, phosphor bronze, high lead, red and yellow ingots of improved quality. Represented by L. Chapman, sales manager; I. Kaden, vice-president.

L

LAMSON Co., Syracuse, N. Y. Booth 387. General conveying equipment.

H. M. LANE Co., Detroit. Booth 377. Drawings and photographs of foundry work done. Represented by H. M. Lane, president; G. Pitt, architect.

LAVA CRUCIBLE Co. OF PITTSBURGH, Pittsburgh. Booth 194. Graphite crucibles, high temperature furnace cements, furnace lining material; crucible furnace covers and base blocks; special furnace shapes. Represented by P. L. Berkey, president; Furman South, Jr., treasurer and sales manager; D. E. MacLean, C. E. Peck and A. R. Gallant, salesmen.

LEEDS & NORTHRUP Co., Philadelphia. Booth 343. Potentiometer pyrometers for recording and indicating the temperatures in malleable ovens; optical pyrometers. Represented by H. N. MacMichael; E. B. Estabrook, district manager, pyrometer division.

LINDSAY-McMILLAN Co., Milwaukee. Booth 360. Delco line of core oils. Represented by W. R. Pate, vice-president; J. A. Gitzen, technical engineer; M. A. Pollard, sales department.

LINK-BELT Co., Chicago. Booths 128, 130, 213, 215. Sand handling equipment, several types of belt conveyor rolls, including the new Link-Belt anti-friction idler; full size Rapp revivifier; new Caldwell car puller; all types of chain manufactured by the company; stereomograph showing lantern slides of various foundry installations.

Represented by R. J. Heisserman, Philadelphia; A. G. J. Rapp, Chicago; W. C. Carter, assistant general manager of the Chicago plant; George O'Conner, Chicago; Lee Harris, Philadelphia plant.

LOUDEN MACHINERY Co., Fairfield, Iowa. Booths 30 to 34, 115 to 119. Overhead carrying system, monorail tracks, turntables, electric elevators, push and pull cranes and complete unit of conveying equipment suitable for every phase of foundry work. Represented by R. B. Loudon, president; H. M. Miller, sales manager; E. H. Seelbach, Syracuse representative; J. P. Lawrence, Cleveland representative; L. E. Gaston, Philadelphia representative; W. H. Eldridge, New York representative; J. A. Niles, Detroit representative; P. L. McCain, Pittsburgh representative.

M

MACLEOD Co., Cincinnati. Booth 166. Model dust arrester, sand blast machine, blacking sprayers, oil burner outfits. Represented by James Lauder, engineer.

MATHEWS CONVEYER Co., Ellwood City, Pa. Booth 296. Various types of ball bearing roller conveyers, especially designed for foundry work. Represented by F. L. Grady, manager Buffalo office; J. H. Hough, sales manager.

MATHISON ALKALI WORKS, New York. Booth 426. Purite. Represented by G. S. Evans, metallurgist; J. R. Schmertz, advertising manager.

C. E. McARTHUR & Co., Chicago. Booth 62. Gagger machine; rod straightener and shear; wire straightener and shear. Represented by C. E. McArthur, partner; C. L. Stewart, representative; William M. Wilson, representative.

J. S. McCORMICK Co., Pittsburgh. Booths 40, 42, 44. Various kinds and grades of foundry facings, core blackings, core binders, sea coal, sand mixer, flasks, vibrators, ladles and charging cans. Represented by J. S. McCormick, president; H. T. Herr, Jr., vice-president; F. J. Buerger, secretary; Stanton R. Cooley, G. Clarence Smith, C. C. Bumbaugh, H. D. Fowler.

R. W. McILVANE Co., Chicago. Booth 293.

METAL IMPROVEMENT Co., Cleveland. Booth 390. Hennig's purifier and desulphurizer for use in the cupola furnace, air furnace and ladle. Represented by Dr. Charles T. Hennig, president; Walter V. Berry, sales manager; George A. Drysdale, metallurgical engineer.

METAL & THERMIT CORPORATION, New York. Booth 101. Carbidefree metals and alloys, as produced by the Aluminothermit process; also Thermit welding compound and samples of Thermit welding. Represented by Arthur F. Braid, sales manager and metallurgical engineer.

H. E. MILLS MFG. Co., Syracuse, N. Y. Booth 342.

MILWAUKEE FOUNDRY EQUIPMENT Co., Milwaukee. Booth 51. Power squeezers, jolt squeezers, jolt strippers. Represented by E. J. Byerlein, general manager; L. E. Gregory, T. J. Magnuson.

MODERN POURING DEVICE Co., Port Washington, Wis. Booths 412, 413. Pouring devices and overhead systems, including several types of crane constructions; monorail system with turntables; Standard trolleys for metal pouring operations and a variety of pouring devices.

MONARCH ENGINEERING & MFG. Co., Baltimore. Booths 251, 253. No. 92 Simplex melting furnace; oil-gas, motor oscillating; No. 125 tilting crucible furnace, oil-gas; No. 45 stationary crucible furnace, oil-gas; No. 1000 Monometer furnace for die casting work or soft metals; dross reclaiming furnace; combination core oven, all fuels; Blizzard sand sifter and motor; special railroad bearing lining furnace; ladle heater, oil-gas; positive blower, oil pump and motor; oil-fired cupola for iron and scrap metal; motor blower, tilting furnace, coal or coke fired for brass, bronze, aluminum, scrap, etc.; iron pot stationary bottom pour furnace for match plate pattern work or soft metals. Represented by George C. Schimpf, general manager; H. D. Harvey, treasurer; J. V. Martin, F. P. Maujean, W. H. Raber, William Chenoweth, sales representatives.

MORSE CHAIN Co., Ithaca, N. Y. Booth 112. Morse rocker joint silent chain drive. Represented by V. D. Morse, sales manager; A. B. Wray, sales engineer; C. F. Morse, assistant sales department; T. M. Manley, assistant sales department.

N

NATIONAL ENGINEERING Co., Chicago. Booths 193 to 197. A complete sand preparing unit. Represented by H. S.

(Continued on page 866)

Contributors of Papers at Cleveland



F. T. SISCO



M. H. MAWHINNEY



W. E. DAY, JR.



W. J. MERTEN

New Records by Steel Treaters

(Continued from page 809)

speaker said that tests at the Bureau of Standards had shown that abnormality of steel has far greater effect on the depth and structure of the case than has the original state of the steel, either cast or hot or cold work. He denied that cold or hot work has any effect on the depth and structure of the case. As proof of this he showed photomicrographs of specimens of hot and cold work carburized under identical conditions and having uniform cores. He declared it is well established from work of the Bureau of Standards and others that most of the abnormal steels give a shallower case than normal steel and that there is evidence that abnormal steel is more prone to get soft spots on hardening than normal steel. For this reason the carburizer should keep informed on normal and abnormal steel, and not leave the latter out of calculation as advised in the paper. On the other hand, he said it did not appear that the author had proved adequately that the original state of the steel may have an injurious result on the carburized layer sufficient to justify annealing before carburizing.

In reply to some of the statements made in the discussion Mr. Merten stated that his conclusions were not the result of laboratory work, but came from long plant experience.

Dendritic Structure: A paper on "A Study of Dendritic Structure and Crystal Formation" by Bradley Stoughton and F. J. G. Duck, Lehigh University, was presented by the latter. The authors discussed the formation of dendritic crystals in over-heated high carbon steel and presented a study of such crystallization, making comparisons in structure and hardness with normal file steel of the same composition. Evidence was offered through the inter-crystalline rupture of the over-heated steel, that the amorphous metal hypothesis does not hold when the crystals are large and there are correspondingly large surfaces of cement. The authors thought that it is possible, following the same reasoning, that the inter-crystalline rupture of the metals at high temperatures is due to the large size of crystals at those temperatures as contrasted with their small size at normal temperatures. They assumed that the smaller crystals as well as the inter-lamellar crystals that occur throughout the eutectoid areas were formed as a result of tremendous pressure brought about by the expansion of the material in its change from austenite to pearlite. The authors presented photomicrographs in support of their conclusions.

Discussion: Dr. Albert Sauveur, Harvard University, submitted a written discussion in which he agreed with the authors that when metals crystallize from liquid masses they commonly form dendrites, but he did not agree with their apparent assumption that

these dendrites are obtained at room temperature. He believed they undergo granulation on cooling before solidification. Each dendrite is therefore converted to many austenitic grams which on cooling through the critical range undergo the austenite-pearlite transformation.

Carbon Content of Pearlite: A paper on "The Carbon Content of Pearlite in Iron-Carbon Alloys Containing 1 Per Cent Silicon," prepared by Dr. Anson Hayes and H. U. Wakefield, Iowa State College, was read by the former. The authors presented a modification of the diagram for pure iron-carbon alloys as a result of an investigation of the graphitizing properties of carbon alloys of white iron composition. The method of determining the carbon content of pearlite as a function of the silicon content was explained. Alloys of various silicon content and containing combined carbon of such value as to produce sufficient pearlite to cover from 30 to 60 per cent of the cross sectional area were made up. The areas of ferrite and pearlite were then measured and the samples milled and determinations for carbon and silicon were made. The carbon content of pearlite was then calculated by dividing the combined carbon content by the fraction of the area covered by pearlite.

Dr. H. A. Schwartz, National Malleable & Steel Castings Co., in discussing the paper, confirmed from personal investigation the accuracy of the findings for alloys containing up to 4.50 per cent silicon.

Graphitization, Magnet Steel and Endurance Properties

A variety of subjects, such as characterized the program for nearly every session, was offered at the first afternoon meeting. These were the effect of cold work on endurance, certain phases of magnet steel and an important paper on malleable castings. Col. A. E. White presided.

Endurance of Metals: D. J. McAdams, Jr., United States Naval Engineering Experiment Station, Annapolis, Md., presented a paper on "Effect of Cold Working on Endurance and Other Properties of Metals" showing that the increase in endurance limit and tensile strength due to moderate cold working previously reported for nickel and some nickel-copper alloys is likewise characteristic of numerous other materials, including copper, aluminum, ingot iron and various brasses and bronzes.

Graphitization in Malleable Iron: H. A. Schwartz, National Malleable & Steel Castings Co., Cleveland, in a paper on "Graphitization at Constant Temperature," set forth a summary of extension data on graphitization and the theory based thereon leading to the conclusions that the rate of graphitization is determined by the rate at which carbon can migrate in the iron and can be measured by the laboratory method outlined by the author. This offers a new and impor-

Contributors of Papers at Cleveland



F. J. G. DUCK



P. HEYMANS



J. P. GILL



J. R. ADAMS

tant means of determining in advance the graphitizability of a lot of hard iron by a rapid test on a representative sample, using as a criterion the amount of carbon precipitated in a pre-determined time.

Discussion: In discussing this paper Prof. Anson Hayes, of Iowa State College, Ames, Iowa, emphasized the importance of the test and suggested as an alternative criterion the time required to absorb all the free iron carbide at 1700 deg. Fahr. He also emphasized the importance of close industrial control of the temperature used in the graphitization process and of the composition of the white iron.

Magnet Steels: A paper on "Some Factors Affecting Coercion Force and Residual Induction in Some Magnet Steels" by J. R. Adams and F. E. Goeckler, of the Midvale Co., Nicetown, Pa., added much important information to the meager literature on this subject and provoked much favorable discussion. In plain carbon steel increase of carbon up to 1 per cent increases the coercive force and decreases the residual induction. With the addition of tungsten or chromium the optimum amount of carbon is changed. The modifications of properties due to these alloying agents take place very slightly above certain optimum compositions and the results do not justify the extra cost. The history of the material is very important, the method of melting, casting, rolling and forging all having a large influence on the quality of the magnet steel produced. Heat treatment must be reduced to a minimum and accomplished rapidly and decarbonization must be avoided. The final heat treatments must be conducted with great care and exactness. The maxim of successfully treating magnet steel is "The less you do to it, and the more quickly it is done, the better."

Discussion: In the written discussion R. L. Sanford, of the Bureau of Standards, Washington, pointed out the importance of re-designing magnetic equipment to utilize effectively the new steels, particularly the K. S. type. R. L. Dowdell, University of Minnesota, noted that the quenching tests indicate that oil quenched specimens contain more austenite than water quenched specimens, confirming evidence previously summarized by Dr. J. A. Mathews. W. E. Ruder, of the research department, General Electric Co., Schenectady, N. Y., presented a conception of "magnetic hardness" similar to Jeffries' and Archer's pictures of mechanical hardness save that the "keying" particles must all be in a special kind of atomic dispersion or combination, and suggested this role for the dispersed austenite.

Gun Forgings, Tool Steels and Mass in Quenching

A feature of one of the sessions was a paper on large guns under the title "Effect of Cold Working on Hollow Cylinders," by Dr. F. C. Langenberg, Watertown Arsenal, Watertown, Mass. It is a paper which

was not pre-printed but an elaboration of an address delivered at the banquet of the spring sectional meeting at Schenectady, N. Y., May 28 and 29 (THE IRON AGE, June 4, 1925).

After discussing the effect of high pressures or cold working on the walls of a given forging—how the strength and elastic limit of the metal can be greatly improved—Dr. Langenberg gave some facts covering the effect of various annealing operations on the elastic limit after different degrees of cold working had been applied. A decided increase was found possible.

It was pointed out by Jerome Strauss in the discussion that Dr. Langenberg had been permitted to make public only a small part of the work that had been done. He then discussed some of the advantages and disadvantages. T. D. Lynch, Westinghouse Electric & Mfg. Co., Pittsburgh, characterized the work and the paper as pioneer in character and then told of his own experience in increasing the strength of wire from 150,000 to 405,000 lb. per sq. in. by cold work. Dr. Albert Sauveur, chairman of this session, called attention to the effect of annealing at a blue heat previously cold-worked steel, with results analogous to Dr. Langenberg's.

Low-Tungsten Tool Steels: An interesting paper on tool steels was offered by M. A. Grossman and E. C. Bain, metallurgists respectively of the United Alloy Steel Corporation, Canton, Ohio, and the Union Carbide & Carbon Research Laboratories, Long Island City, N. Y., under the title "On the Nature of Some Low-Tungsten Tool Steels." This paper is one of a series on the constitution of certain steels of wide commercial application. Two low tungsten steel were examined for shrinkage and expansion after various heat treatments. The resulting changes were found to be significant of the structures of the steels as hardened. A mixture of martensite and austenite makes up the entire structure of the oil-hardening steels, while this structure appears only on the surface of the water-hardening steels, the center of which is largely troostitic. The heat treatment of the oil-hardening steels, generally recommended, is a quench at 1650 to 1700 deg. Fahr., followed by tempering at about 350 deg. Fahr. This offers the best combination of hardness and toughness.

Discussion: The discussion was participated in by Howard Scott who emphasized the value of a knowledge of volume changes, and Jerome Strauss who said that the steels discussed are useful as non-deforming steels. Manganese and tungsten steels, however, show less variation than chrome steels and are hence very useful. For deep hardening and non-deforming, the manganese steels are the best. F. B. Foley called attention to the fact that the higher the quenching temperature, the higher the impact value at certain drawing temperatures, which is of practical value.

Authors of Papers at Cleveland Convention



F. E. GOECKLER



H. T. CHANDLER



O. Z. KLOSCHE



A. C. FORSYTHE

Quenching and Mass Effects: Mass effects in quenching was discussed by H. J. French and O. Z. Klosch of the Bureau of Standards under the title "Initial Temperature and Mass Effects in Quenching." The results of quenching experiments with high-carbon steels are given in which the speed of cooling was determined at the center of spheres, rounds and plates of various dimensions quenched from various temperatures, into different coolants, such as water, 5 per cent sodium hydroxide, oils and air. The cooling velocity at 1330 deg. Fahr. is taken as the best measure of hardening produced. Relations are also developed between the size and shape of the tool quenched.

In reply to a question from Haakoan Styri, S. K. F. Industries, Philadelphia, as to whether cooling rates had been determined at the surface of the steel, Mr. French said that work on this was in progress. E. J. Janitzky, metallurgist, Illinois Steel Co., Chicago drew on the blackboard formulas by which cooling rates can be satisfactorily computed.

Dilatometers, Fatigue and Carburization

The dilatometric method of heat treatment, fatigue phenomena and carburization were discussed at one of the sessions.

Carburization: E. E. Day, Jr., of the International Motor Co., New Brunswick, N. J., presented a paper on "Carburization by Solid Cements," in which the carburization process was treated as consisting of three steps, the formation of the appropriate gaseous carbon compounds, the solution of the carbon in the surface layer, and the diffusion of the dissolved carbon inward from the surface layer. A test for the action of a given carburizer on a particular steel was suggested, in which a standard test piece is packed in a standard box, heated to a pre-determined temperature for a pre-determined time and the carbon penetration and distribution determined by a series of successive light cuts in the lathe. The mechanism of diffusion was shown to be analogous to the flow of heat in a solid.

Dilatometric Heat Treatment: A paper on "The Dilatometric Method of Heat Treatment" by Prof. O. E. Harder, R. L. Dowdell and A. C. Forsythe of the University of Minnesota described a type of dilatometer used at the University, and presented curves showing the change taking place in the expansion curves at critical points. In discussion, R. W. Woodward, of the W. S. Rockwell Co., Hartford, Conn., called attention to a similar type of instrument which has been in practical use for some time for the control of heat treating on a production basis. He emphasized the absence of any lag between the condition of the sample and the indication of the condition by the instrument.

Failure by Fatigue: Prof. H. F. Moore, of the University of Illinois, in a paper on "What Happens

When Metals Fail by Fatigue" presented a picture of slip within crystalline grains of metals, resulting in roughened surfaces and consequent increase in resistance to further slip, combined with a "filing" action, of surface on surface under the alternating stresses, which wears off projecting particles and gradually develops voids and eventually cracks, which spread until the sound metal is no longer able to support the load.

In discussion, Dr. H. W. Gillett complimented Professor Moore for his suggestive treatment of the question and R. R. Moore, McCook Field, Dayton, Ohio, stressed the importance of fatigue testing for airplane and automobile parts.

Symposium on Metallurgical Education

A group of 75 men interested in metallurgical education met at luncheon Tuesday noon to discuss the subject. Considerable attention has been given to it by the society. Prof. A. E. White, University of Michigan, reviewed the work of a special investigation headed by Mr. Wickenden, which finds that, despite the great increase in numbers of college entrants and the expansion of engineering schools abroad, the registration in our own engineering schools has been about stationary for the past three years.

L. W. Wallace, of the Federated Engineering Societies, deplored this condition. In his view, America is on the threshold of a fierce battle for world markets, wherein the intensified industrial research of Germany will prove the winning weapon, unless matched by an equal development in America. He, therefore, urged the society to support strongly any project on appropriation which would bring more funds for technical education.

Seemingly the pedagogues and industrial men are far apart in their conceptions of the proper training of engineers. Prof. H. M. Boylston, Case School of Applied Science, likened the university to a blooming mill; receiving raw materials with many imperfections and turning out a semi-finished but improved product. He said that the educational trend was toward a five-year collegiate course, so that time could be had for the many special subjects which the engineering executive must understand.

C. E. Skinner, Westinghouse Electric & Mfg. Co., pointed out that despite the effort of universities to produce specialists, industries wanted men who were properly grounded with the fundamentals. He recalled the unquestioned fact that a major activity of all big corporations is the training of men, the building of the organization. The principal interest of Benjamin Lamme, chief designer of his company, during the last years of his life was the training courses which he personally supervised for the brilliant young men in his department, and his chief legacy to his organization

Authors of Papers at Cleveland Convention



T. G. DIGGES



R. L. DOWDELL



M. A. FROST



H. W. BOULTON

and the industry as a whole was these men who had become specialists in past college days under his guidance.

The Annual Business Meeting

The annual meeting of the society, held at Hotel Cleveland, on Wednesday morning, Sept. 16, had nothing more than routine matters to consider. There were the reports of the officers, with President Bidle noting visitations to 19 of the chapters and expressing the hope of visiting eight others before the end of the year. Secretary Eisenman reported a net gain in membership for the year ending Aug. 31, of 337; that the 29 chapters had held 224 meetings in the year with an aggregate attendance of about 25,000 and gave other information as to the activities of the national officers in connection with the Henry Marion Howe medal, recommended practices, data sheets and the society's publications.

A very healthy financial condition was disclosed by the report of the treasurer, Dr. Zay Jeffries, with receipts still running safely ahead of expenditures but with a gradual increase in the service to members. He said that a healthy surplus was necessary as service to members increased. The report of the nominating committee appeared in THE IRON AGE, Sept. 17, page 764.

With the announcement that the next convention of the society would be held in Chicago at the Municipal Pier in September, came a suggestion for a change from September to October on the score of better weather in the latter month. This brought a reply from President Bidle that there were many other considerations beside the weather that had to be weighed, among them conflict of dates with other societies, the availability of convention halls and the necessity of taking the dates that could be secured. The suggestion did not reach a motion stage.

Cracks in Cast Iron, Salt Bath Furnaces

A discussion of the causes of warps and cracks during heat treatment was presented by J. F. Keller, Purdue University, at one of the afternoon sessions. Mr. Keller conducts university extension work on heat treatment among the industries of Indiana, and his paper is an attempt to reduce an abstruse subject to terms understandable to the mechanic who attends his classes. By means of homely illustrations and simple experiments in localized heating and shrinkage an explanation is possible of such varied matters as stresses during welding, internal ruptures during casting and forging, and quenching cracks. While some critics pointed out places where the simplified concepts were not strictly in accord with scientific accuracy, the paper was commended as a pioneer attempt at explaining the difficult facts of metallurgy in A B C terms.

Welding alloy steel tubing for aircraft was investigated by F. T. Sisco and H. W. Boulton of the Army Air Service. It has become standard practice to construct the skeleton of airplane fusilages of thin-walled steel tubing, with all intersections welded. The present paper is a study to determine the possibility of improving the joint by means of a special welding rod and subsequent heat treatment. By means of proper supervision and control of the few fundamentals, there was no difficulty in producing a series of perfect welds for the investigation. Under test, these joints failed

Future Conventions

The eighth annual convention and exposition is to be held in Chicago in the fall of 1926.

The probabilities are that Philadelphia will be selected for the 1927 gathering, with Detroit in the lead for 1928.

The winter sectional meeting will be held under the auspices of the Buffalo chapter in January, 1926.

The spring sectional meeting has been scheduled for Hartford, Conn., late in May or early in June, next year.

in the area near the weld where the heat-treated tubing had been annealed and softened by the welding heat. Appropriate heat treatment of the welds in chromium-molybdenum and chromium-vanadium steel eliminated this soft spot and served to equalize the structure at the weld and produce a fine grained uniform material, with corresponding improvement in physical properties.

New Honors Announced at the Banquet

Several important announcements were made at the annual banquet held at the Hotel Cleveland, Thursday evening, Sept. 17. There was an attendance of about 450, with George M. Graham, vice-president Chandler Motor Car Co., as toastmaster, and with city manager of the City of Cleveland, W. R. Hopkins, the principal speaker.

Salutations from Sir Robert Hadfield

Greetings from Sir Robert Hadfield, an honorary member of the society, were read by President W. S. Bidle, master of ceremonies for the evening. The cablegram was as follows:

As one of your honorary members, a privilege I greatly esteem, permit me to offer your society my heartiest good wishes for the entire and complete success of this great and unique gathering. Long may the science of metallurgy flourish, root and branch.

ROBERT HADFIELD.



DR. C. F. BRUSH

Howe Medalist and New Honorary Member

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Horace H. Lester, the 1925 Henry M. Howe medalist of the society, received his B. A. degree from the University of Minnesota in 1906, his M. A. degree from the University of Washington in 1912 and his Ph.D. degree from Princeton University in 1915. He was assistant professor of physics at the Case School of Applied Science, 1921 to 1922. In 1922 he became research physicist of the Watertown Arsenal, Watertown, Mass., where he is now located.



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smaller draft of current per ton. The power consumption is about constant throughout the operation.

It is the practice to charge 636 lb. of metal and to leave about 100 lb. in the bottom as a basis for the next charge and to help the induction. This makes the total charge 736 lb. Figures given by Mr. Seede show the current use, as follows:

Crucible	Metal	Charge lb.	Kilo-watts	Time min.	Kwhr. per ton
Cold	Nickel-silver	636	90.1	109	502
Hot	Nickel-silver	636	92.8	78.6	382
Cold	Yellow brass	636	99.0	64	332
Hot	Yellow brass	636	99.5	43	225
Hot	Copper	636	100.0	69	362

Electric Arc Hot Tops for Ingots

An interesting application of the use of an arc in keeping ingot tops hot was described by Mr. Watson of the International Nickel Co., Huntington, W. Va. Ingots of monel metal and of other metals have been cast at that plant with the large end up, in the usual molds of cast iron. The largest ingots, 13 by 13 in. and 66 in. high, weigh about 4000 lb. The ingots taper to about 10½ in. square at the bottom, with the mold enough thicker at that point to maintain is outside walls parallel with each other.

It had been the practice to pour a long sink head on top of the ingot, sometimes 18 to 20 in. high. This had to be cut off at considerable expense, to get rid of the pipe in its upper end. Thus 800 lb. of ingot became scrap. And sometimes the pipe extended still farther down and another cut had to be made.

To avoid this loss and its cost six semi-portable electrode-carrying trucks were built whereby an arc can be made at the top of the ingot and the metal kept hot. Each truck can handle one ingot on one phase of the 3-phase line. A refractory hot-top mold of brick, etc., is built up about 6 in. high on top of the ingot mold and the metal is poured until this hot top is 4 in. deep. Then, after an interval of three or four min., the contact is made and the arc formed by means of a carbon electrode 3 in. in diameter. About 2000 to 3000 amperes flow, at 100 volts or so, for two min. The current then is "tapered off" to 800 or 1000 amperes for an additional three min. The total current draft is about 10 to 12 kwhr. per ingot.

This leaves the top of the mold free from pipes and the hot top, which is about 3 in. high at the end of this operation (a shrinkage of 1 in.) becomes a part of the ingot. It is not cut off. Thus about 10 per cent more usable tonnage is obtained from each heat than was available before and 85 per cent of what previously was rejected now is recovered. This method is applied to about 1000 tons of ingots per month.

Heat Treating Furnaces

"Electric Heat Treating Furnace Applications," a paper read by E. A. Hurme, manager steel mill division, Westinghouse Electric & Mfg. Co., East Pittsburgh, dealt with various types of equipment. The elevator type electric furnace for annealing steel sheets (see illustration, THE IRON AGE, July 9, page 74); bright annealing of copper wire (page 75); heat treating room for tools (page 74); annealing of castings, etc., were described.

In discussing the equipment used for heat treating, Mr. Hurme showed section diagrams of 14 furnaces, indicating the faults or good qualities of various arrangements for specific purposes. "Control of the furnace chamber is essential for best results, but the temperature must be uniformly applied to the work. This requires attention to the shape of the chamber and to the method of loading. The best condition is that in which heat is applied to the greatest surface and mass of the charge. Application of heat to the bottom is often neglected, which leads to non-uniform heating. This can be solved by raising the charge off the floor.

Uniform Product Demanded

"In comparing electric and fuel-fired furnaces in this respect it must be realized that, with suitable equipment and proper attention, the fuel-fired furnace, as well as the electric furnace, can be made to maintain a uniform temperature, as indicated by the tempera-

ture chart. The purpose of the furnace, however, is to produce a uniform product, and not uniform temperature charts, so that proper design must be given to the furnace, to apply the heat uniformly to the product.

"A perfectly uniform temperature chart shows that the temperature is uniform at the point in the furnace chamber at which the temperature-indicating device is located. It does not mean, however, that the temperature throughout the furnace is uniform, for it may vary widely. To secure uniform application of heat, and uniform temperatures, requires careful attention to the design and method of loading, whether the furnace use gas, oil or electric current. It must not be assumed that a furnace will give better results, merely because it is electrically heated.

Heat Applied Differently

"The electric furnace differs from fuel-fired in the manner of the application of heat. Most of the heat transfer in the electric furnace is by radiation; the remainder is by convection, which is depended upon to a certain extent to apply heat to those surfaces which are not reached by radiation from heating elements and walls. By proper distribution of heating elements, however, practically a uniform temperature distribution can be obtained and the transfer by convection reduced to a small quantity.

"With the fuel-fired furnace, a large part of the heat is transferred by direct convection from the hot gases circulating about the charge, and some by radiation from walls and burners. The dependence placed on circulation of the gases leads to non-uniform temperature distribution. Owing to the nature of the gas- or oil-fired furnace, large sources of heat are concentrated at a few points. In the electric furnace the heating elements can be distributed almost uniformly over the walls and, if desirable, on the top and bottom.

"In a combustion furnace, where the source of heat is the flame, it is almost impossible to maintain a uniform temperature from front to back, and from top to bottom. The higher the temperature to which the piece is to be heated, the easier it is to obtain a uniform temperature. Hence, good results can be obtained at 2300 to 2500 deg., Fahr. At temperatures below 1800 deg., hot spots and cold spots will be found in all combustion furnaces.

"In continuous or rotary type furnaces, where the chamber is relatively long, electric heat is especially desirable, because of the ability to distribute the source of heat over the length of the furnace. Often, in such furnaces, the work is subjected to varying temperatures, as it progresses through the furnace. The electric furnace can be divided into zones and the temperature of each zone adjusted to suit requirements."

Electric Soaking Pits

"Heating of Ingots by Electricity," a paper by Ralph A. Butler, efficiency engineer Donner Steel Co., Buffalo, was presented in connection with the report of the electric heat committee. This was amplification of the paper read Jan. 30 before the Pittsburgh meeting of the association by T. F. Bailly, president Bailly Furnace Co., Alliance, Ohio. (See THE IRON AGE, Feb. 26, page 617). Attention was centered on the electrically-heated soaking pit at the Donner plant, the design of which was prepared by Mr. Bailly.

H. E. Seibert, combustion engineer Bethlehem Steel Co., Bethlehem, Pa., in discussing the paper, called attention to a comparison of costs between a rivet heating furnace heated electrically and one oil-fired. With electric current at ½c. per kwhr. and oil at 6c. per gal. the "fuel" cost of the electric unit was higher. At the same time, with the greater uniformity of operation of electric heating, one is enabled to get away from the human equation. Anything which reduces the human factor in such a case is a definite gain, he said.

Mr. Bailly repeated what many speakers at this session had said, when he disclaimed all intention of meeting, in an electric unit, the low fuel costs of oil or gas or coal. That comparison, per se, is not valid and has no place in the true comparison between the two types

of equipment. With regard to the Donner installation, he showed slides of ingots from the electrically-heated pit, virtually free from scale, and with no cinder hanging from the bottom, alongside ingots of the same heat of steel, taken from gas-fired pits and showing more or less heavy scaling and a large cinder "gob." Taking account of the scale loss alone, he said, would bridge over the difference in fuel cost.

In addition, when it comes to a new installation, there is a distinct saving in that the electrically heated pit takes only half the floor space of the gas-fired pit. The unit in the Donner plant was described by Mr. Baily as a small experimental pit. It was a pioneer and no larger pit could be had for the experiment; it was a case of "make the best of it" to get such an installation in at all. The current consumption, with ingots at about 1650 deg. Fahr., was about 80 kwhr. per gross ton of ingots. Thermal efficiency was low—only 50 per cent, whereas 80 to 85 per cent may be expected under ideal conditions, and with the pit better adapted to the process.

Cold Steel Limitations

"Electric heating of cold steel may be feasible on alloy steel or other high-cost materials, or where it is urgent to avoid scale," said the speaker, "but it is not recommended for cold ingots. Probably never will it be able to heat cold steel at a cost comparable with gas or oil. In fact, the hotter the entering steel, the more efficient does the electric heating become."

W. P. Chandler, special engineer Carnegie Steel Co., Pittsburgh, and chairman of the combustion engineering section of the Association, made another comparison. With 80 kwhr. at $\frac{1}{4}$ c. per unit the electric cost of heating ingots becomes 60c., against 18c. to 20c. per ton with gas. It may be that a lower cost in the chipping yard, due to better heating conditions with electricity, would overcome this difference. The comparison must consider all pertinent factors.

Mr. Knapp of the General Electric Co. pointed out that the electric furnace is not a cure-all. But for certain work, such as the heat treating of gears, the saving in losses amounts to several times the total current cost. Improved working conditions justify a certain expenditure, just as money is spent for safety, sanitary and lighting requirements and on painting up the plant to help make a better place to work. Some of these "intangibles" must be capitalized before we can tell whether electric heating "pays." The question of labor turnover is intimately associated here. And in one plant the gas-fired furnaces, with their crew, turned out in a day only three-fourths as much product per man as came from the electric furnace department.

Power Problems

Friday's session, devoted to power plant problems, consisted of the reading of two papers and discussions upon them. "Auxiliaries and Auxiliary Drives for Steam Electric Generating Stations," by A. L. Penniman, superintendent of steam stations, Consolidated Gas, Electric Light & Power Co., Baltimore, and F. W. Quarles, his assistant, was read by Mr. Quarles. The authors undertook the design of a fairly large generating station as a basis for the study of the proper types of auxiliaries to install. The scope was limited to the steam generation of electricity in a steel mill.

Driving of auxiliaries by steam, by motor supplied with power from the main bus bars, by motor supplied from a house turbine, by direct or belt connection with the main shaft and by motors supplied from generators connected to the shafts of the main units, all were considered. Auxiliary service was divided into three classes: — equipment little affecting the main power if stopped temporarily; that required only when station is carrying load; that intimately related to production of power, the stoppage of which may result in disaster or in prolonged interruption to the service.

Selection of steam or electric drive for these many units, separately considered, formed the bulk of the paper. Considerable discussion was evoked. Several central station engineers advocated use of electric motors in many places where steam drive was recommended by the authors. Among those who differed

from this point of view was George A. Orrok, consulting engineer New York Edison Co. He reiterated what other speakers had emphasized: "Reliability is a paramount consideration." He pointed out that, with auxiliaries upon the steady functioning of which the whole system depends, it is out of the question to take a chance.

Reliability Paramount

"Electric motor drive is one link of the chain further removed from the initial steam than is a turbine," Mr. Orrok said. "The turbine may operate so long as the boilers function. But once an interruption comes on any part of the electric side of the house, the continuity of operation of the motor may be in danger." Boiler feed pumps, circulating pumps and exciters, in the order named, were placed in the class of "touchy" auxiliaries which must be kept running at all hazards.

Mr. Penniman, in a pungent and most comprehensive discussion of the points brought out by various speakers, gave numerous citations from his own experience. He told why the authors had favored this type of apparatus and that type—how such a unit had failed at a critical moment and such another had worked. He had some "answer" ready for every objection which had been raised by those who had discussed the paper, and most of them seemed to ring true.

Preheated Air for Boilers

"Extending the Heat Cycle in Boiler Operation by the Use of Preheated Air for Combustion," the last paper of the convention, was read by Joseph G. Worker, vice-president American Engineering Co., Philadelphia. He detailed various types of heaters, their insulation and that of the air ducts, and their connection into the system. Dividing the fuel bed of the stoker into four zones—1, where moisture is evaporated and volatiles are distilled; 2, where partly coked fuel and carbon are burned; 3, where almost complete carbon is burned, and 4, where some of the carbon in the refuse is burned—he pointed out the effects of preheated air in each zone.

W. P. Chandler, who presided at this session, deprecated the fact that little information seemed to be available as to whether it would pay to preheat the air. Mr. Worker said that no general answer to this problem could be made. Each case has to be considered on its merits.

George A. Orrok pointed out that preheating of air has been practiced continuously for more than a century. For half that time we have had the Howden and other systems and all of them work and work well. Whether it will pay depends in large measure, he said, upon the efficiency of the plant. Cases were known where a particularly bad plant operating at only 45 per cent efficiency, had been raised to 60 per cent by this means. This very great improvement may be set against a high-efficiency plant, where the 88 or 90 per cent might be increased by preheated air by only $\frac{1}{2}$ or 1 per cent—to 88 $\frac{1}{2}$ or 89.

An engineer of the Blaw-Knox Co., Pittsburgh, gave lantern slides of a type of regenerative air preheater just put out by his company. This effects heat interchange between hot flue gases and incoming air by heating the surfaces in a series of passages and then passing the air through. The use of a cam-operated set of valves, operating three sets of passages, and accurately timed to prevent meeting of flue gases and air, was the basis of the design.

Diesel Engine Lecture

On Tuesday evening a lecture was given by George A. Richardson of the Bethlehem Steel Co., Bethlehem, Pa., illustrated by motion pictures. Stress was laid upon the ease and quickness with which the Bethlehem engines can be disassembled for replacing of parts. The successive views showed removal of various valves, the piston rings and other parts, all of which were accomplished with great celerity. Complete inspection of piston rings, replacing when necessary, can be made in 100 min., it was stated. To do this the connecting rod, released from crosshead, is swung down out of the way. Then the piston is lowered, with suitable safe-

guards, until its head is clear of the cylinder bottom. This permits ready removal of the rings.

Much disappointment was expressed (privately) at the slender attendance, both at technical sessions and on the floor of the exhibition hall. Some attributed this to the relative inaccessibility of the location, and particularly to the fact that it was not easy to go to the Commercial Museum from the Benjamin Franklin Hotel, except by the expensive taxicab route. A sharp contrast was drawn with the success of the previous Philadelphia convention, when the exhibits were located on the roof of the Bellevue Stratford Hotel. This was

within easy reach from everywhere. Hot weather, with the attendant lure of Atlantic City, was quoted as another reason for the lack of large interest. Sessions were late in getting under way (Thursday morning it was 10:45, where the schedule called for 9:30, and the Friday morning session was not adjourned until 2 p.m.), because of waiting for speakers and audience. The illustrated lecture Wednesday evening was heard by only a score of persons.

(Brief description of the exhibit of equipment will be published next week.)

Competition No Bar to Cooperation

Concrete Bar Distributors Hold Semi-Annual Meeting—Joint Efforts to Solve Mutual Problems Recommended—Advertising Is Urged

INTELLIGENT competition as related to cooperative efforts to solve the problems of distribution, the need for well planned sales promotional work, with particular emphasis on advertising, the value of association, statistical service and proper cost methods for concrete bar dealers, together with committee reports on credit information, grades and standard sizes of steel, importations of foreign steel, and uniform sales contracts, were high lights of discussion at a semi-annual meeting of the Concrete Reinforcing Steel Institute held at the Drake Hotel, Chicago, Sept. 23.

Speakers included Charles F. Abbott, executive director American Institute of Steel Construction, New York, whose subject was "Competition"; Clarence T. Kingsbury, president Rosslyn Steel & Cement Co., Washington, who spoke on "Economic Aspects of Trade Warfare"; William F. Zabriskie, vice-president Gabriel Steel Co., Detroit, who discussed the displacement of structural steel by concrete reinforcing steel; and Richard L. Humphrey, Philadelphia, who outlined the future program of the institute's joint committee. At an evening session a newly made moving picture film was shown covering operations in the works of the Wisconsin Steel Co., Chicago.

Statistical Service of Institute

In spite of a limited budget, the institute has become a clearing house for information of interest to the industry, said W. H. Pouch, president of the association and president Concrete Steel Co., New York. It has gathered confidential statistics from members and has published composite reports showing: (1) the total tonnage of bars and spirals shipped during the past five years; (2) tonnage sold during the first six months of 1925, by districts; (3) tonnage shipped from warehouses and mills for a similar period; (4) stocks on hand each month contrasted with normal supply.

He stated further that it is important for members to know their own warehouse costs, taking into consideration every component operation, if they are to make intelligent quotations and carry on their business at a profit rather than at a loss. To that end a group of cost accountants developed for the institute a simple, but uniform, system of tabulating warehouse costs with the segregation of such items as unloading, cutting, bending, loading, indirect labor, depreciation, etc., and this system went into effect July 1.

Mr. Pouch also called attention to the fact that the institute had been given the privilege of making a critical review of the section of the national building code which is being drafted by the United States Department of Commerce relative to recommended unit working stresses for timber, steel and concrete for buildings.

Competitors Have Mutual Interests

Charles F. Abbott, executive director American Institute of Steel Construction, speaking on "Competition," said, in part:

During the past ten years great advances have been made in production. Efficiency methods have been standardized and have reduced costs. Finance,

likewise, has received similar attention, but when we approach the element of distribution, little or nothing has been accomplished. Selling costs are too high, competition is keen, and the lack of an equally scientific study has left distribution in more or less of a chaotic condition; still, selling at prices that bring reasonable profits is the greatest of all problems.

Well-Planned Sales Policy Needed

Well-thought-out sales policies vigorously enforced and that equally protect both buyer and seller must supplant the old rule-of-thumb method. Fair dealing must prevail and favoritism or partiality must be avoided. Prices, terms and discounts must be established on a basis fair to all concerned. The custom of quoting varying prices, depending upon how anxious one is to receive the business, is but an attempt to revive the methods of the horse trader, now as obsolete as Noah's ark.

Salesmen must be carefully selected, trained and supervised. They must be men able to obtain business on their terms and prices, and not mere order takers who obtain their business by cutting the price. They must abandon the old method of concentrating their effort on the sale of the tangible thing called merchandise, and accept the idea of emphasizing service, good will, reputation, favorable location, superior quality and workmanship.

Value of Trade Publications

Aggressive, intelligent advertising must be appreciated and understood. The trade publications should be supported, and through such media a national consciousness of the product should be developed. A better understanding and appreciation of the industry and of its service should be created, and the value of a favorable public opinion be made of paramount importance.

It is to be regretted that, in these days in which advanced business methods are a necessity if competition is to be met, we still find a few who insist upon the old belief that promotional effort is not necessary and any money expended for that purpose is a waste and a loss of time. They are those who still cling to the idea that all advertising is an economic waste. To them we should extend our sympathy in their ignorance, and attempt, through educational means, to bring them up to 1925 and point out to them that the world has advanced, that hours have been reduced to minutes, and miles to inches.

Advertising an Investment

Assessments to your industrial organization, or money paid for advertising or other promotional work, represents a decided investment from which you may expect very definite returns. It is a well recognized fact that investments of this kind are considered as an item of cost and charged accordingly, the public paying the charges. This might appear to be unfair to the public, but when you stop to consider what the public receives in the way of reduced costs, improved materials and superior benefits, then you will find that the small amounts they pay fade into insignificance as compared to the benefits they receive.

A small assessment is worse than nothing. One-half of one per cent to one per cent of the total gross sales would be in line with reason and would permit a campaign that would accomplish results.

Let Railroads Buy Bolts and Nuts

An Industry That Has Been Under the Harrow
Asks That Transportation Interests Co-
operate and Not Compete

PRESIDENT CHARLES J. GRAHAM of the Bolt, Nut and Rivet Manufacturers' Association, has sent out from his office in Pittsburgh a frank and arresting statement concerning the plight of his industry and what should be done about it. He has taken pains to have copies of the pamphlet go in the past week to all executives, directors, mechanical officials, shop superintendents and purchasing agents of railroads in the United States and Canada; also to leading industrial executives and bankers.

It may be news to some of the individuals on Mr. Graham's mailing list that the bolt, nut and rivet industry has been so hard pressed in recent years, but what he says of the demoralized state of the market for these products is no news to

those who have followed the course of bolt and nut prices in the past two years. Mr. Graham addresses himself to railroad executives particularly, because so many railroads, instead of buying bolts, nuts and rivets in the market, have been manufacturing these products themselves for their own use.

After telling briefly what the railroads have been through, due to the destruction of their morale under Government control, Mr. Graham says that they "staged the greatest comeback, in a period of five years, ever attained in any line of endeavor," largely because they had public sentiment behind them in a way unparalleled in their history. From that point we quote his statement in full below:

Post-War Years Bring Marked Changes in Industry

"Under this new scheme of things there has been a great increase in efficiency, and today the roads are securing at least a 25 per cent increase in man power over the war period.

"As an example: Had one of our large systems, owning approximately 250,000 cars, been operating in 1923 (the peak traffic year up to that time) on the basis of 1918 efficiency, it would have required 60,000 additional cars to handle its traffic.

"While the rate structure of the country has not been adjusted as yet to give the railroads the return contemplated by the transportation act, they have at least been given an opportunity to live and make a return which, while lower than it should be, is better than is obtained in most other lines of competitive industry.

All Industry in Like Plight

"Competitive industry generally is facing a crisis today almost as serious as that which confronted the railroads 10 years ago, but for an altogether different reason.

"As a result of conditions existing during the war, large increases in capacity in all lines were created, and we now have an over capacity in almost all of our leading commodities running, in some cases, as high as 40 per cent. As a result of unbridled and uneconomic competition—brought about by not only this over capacity but by the operation of restrictive and burdensome legislation—industry generally has been unable to make a fair return on invested capital and is having the same struggle for existence heretofore experienced by the railroads.

"Therefore, through proper publicity industry should place its position squarely before the public, the railroads and the Government, and ask for a square deal and their moral support in trying to bring about a healthy condition in this, the heart of American commercial supremacy.

"The operation of our major industries practically without profit, and in a great many cases at a serious loss, is uneconomical and a detriment to the proper growth and expansion of our country as a whole, and the correction of such a condition is as important to the life blood of the nation as it was to give the rail-

roads—the arteries of our industrial development—a chance to recuperate.

Boom Upswings Are No More

"Industry is in a new era. The great speculative periods heretofore existing in our business life have become a thing of the past, and opportunities do not arise to recoup in what might be termed 'boom periods' the losses sustained in periods of depression. 'Boom periods' in the past were brought about chiefly by speculation. This created an unhealthy wave of buying which forced prices beyond a reasonable level, caused congestion in our mills and factories and on our transportation lines, and was always followed by what might be termed the natural result—terrific depression, while the country was compelled to absorb its gluttonous repast.

"This condition reached its high level in 1920 and the reaction in 1921 was the greatest lesson industry ever had of the absurdity of such methods. In other words, 1921 was the great year of cure for conducting industry as a speculation rather than on a sound commercial basis.

"In any event, the opportunities to speculate do not exist today as they did heretofore—we do not have the violent fluctuations in our basic commodities that formerly existed. The ownership, particularly of our major industries, has fallen largely into the hands of the people, and their officers are compelled to give more thought to other than the greed of taking business, and are forced to operate on a profitable basis or with as little loss as possible.

Railroads as Manufacturers

"These unhealthy periods of inflation forced upon our railroad systems (to enable them to obtain material on which to operate) the necessity of becoming manufacturers of many of their needed commodities, so they stand in the unique position of being not only in the transportation business, but very active competitors in a number of manufacturing lines. As a result of this, many industries must now appeal to the railroads for their cooperation and support in throwing back to the manufacturing interests that to which they are justly entitled.

"This condition was brought about by circumstances

beyond the control of industry as well as the railroads. As manufacturers confine themselves entirely to their given lines, developing always to a point of low-cost production, so should the railroad executives confine themselves exclusively to their business of transportation to develop it to the fullest extent—the best transportation at the lowest possible cost—rather than have a part of their time and effort engaged in industrial problems.

"Industry today has reached such a stage of development and specialization that it cannot be operated successfully as a side line; and it can be stated without fear of contradiction that, should the railroads cease entirely their manufacturing activities, they would not only be able to secure all their materials within a reasonable time, but save millions of dollars per year—vastly more than sufficient to pay a large return on their capital invested in such manufacturing properties—and, in addition, would enable them to confine themselves entirely to the problem of transportation, which is in itself large enough for any organization to solve.

Losses of Bolt and Nut Industry

"The bolt, nut and rivet industry of the United States has an investment exceeding \$150,000,000; and, as a result of over production, unbridled competition, and other causes beyond its control, reached a stage in 1924 where its net losses ran to approximately \$1,000,000 per month, and to the point where a number of manufacturers were facing absolute bankruptcy. This industry reached a state of complete demoralization—one bordering on chaos—and as a matter of self-preservation was compelled to make a right about face, gather its forces, and make a careful study of its condition.

"This period of study developed an almost unbelievable situation. It was found that since the inception of the industry not one constructive move had ever been attempted by the industry as a whole, that all the time and thought of the individual manufacturers was to develop their industrial plants and companies regardless of their competitors, and, if it became necessary, to carry on in an endeavor to put competitors out of business. In other words, it found the whole basis of its past business experience and methods had been built on selfishness. Countless evils had crept into its business method and no effort of any kind had ever been made to eradicate them. They were fostered and developed to a point where they became the controlling factors.

Applying the Cure with Government Help

"The first constructive move was started in August, 1924, and, the items given the most careful consideration were uniform cost accounting, standardization, the elimination of waste, uniform kegs and packages—all in line with the policy of, and the three latter in co-operation with, the Department of Commerce. Last but not least, the throwing open to competitors of practically all of its plants so that all would have an opportunity to benefit from the experience and example of the low cost producer—the company with small capital to have the full knowledge of the accomplishments of the company with unlimited resources, and to install improvements without the large experimental expense necessary in development work.

"In other words, the chief object of this industry is to have every plant operate on as low a cost basis as possible, so that all will have an equal chance in profits or losses—whatever they may be—and the great saving attained by such methods be handed down to the ultimate consumer.

Only a 60 Per Cent Demand

"One of the biggest problems it had to face was overproduction and to find ways and means to fill the gap between a 60 per cent operation under normal conditions and the hoped for 100 per cent. It developed after investigation that for reasons heretofore stated almost all railroads and large industrial consumers had

installed machinery to take care of at least a portion if not all of their own requirements. This, then, was found to be the most productive field on which to begin its work.

"A railroad department was installed and a careful study made to determine whether or not material could be sold by the industry to the railroads at lower than their own cost of production, and in all cases investigated up to the present time this was demonstrated conclusively.

Railroads Could Save Money by Buying

"The bolt, nut and rivet industry, therefore, makes an appeal to all the railroads for an opportunity to demonstrate its ability to make them a large saving in this commodity, to ask their hearty cooperation in an effort to live, to permit of an economic operation of its plants and to produce for the railroads, not only a superior article at less cost, but to enable them to largely increase that item for which they are striving at all times—additional traffic.

"It should be the aim of the railroads to foster industry and not compete with it. Industry is largely responsible for the revenue on which the railroads exist. Their cooperation will not only increase revenue as a result of increased traffic, but will be a great saving in the purchase of material rather than the manufacture of it.

"Let the slogan of industry and the railroads be 'live and let live.' Let each strive for the other's interest. It is purely a mutual proposition and is only carrying out the basic principle of our earlier education, 'Help one another.' The benefit of such a policy is, in the end, for the public as a whole and is what every interest, in this twentieth century, should be striving for.

"The executives of the bolt, nut and rivet industry, therefore, go on record as assuring a spirit of fair dealing, of honesty of purpose, of a new code of ethics in business, and earnestly solicit the full cooperation of all railroads and industrial executives in their endeavor to salvage what is left of their life's work, to make of their industry something of which they may be justly proud, and to enable what is now a cripple in American commercial life to walk upright once again."

Western Rate Advance Case Continued

Preliminary hearings on an application of Western railroads for a 5 per cent general advance in freight rates in Western classification territory were closed at Chicago on Sept. 16. The case will be reopened at the Edgewater Beach Hotel, Chicago, Oct. 26, at which time Clyde B. Aitchison, chairman Interstate Commerce Commission, will permit cross-examination of railroad witnesses by counsel for protesting shippers and farmers.

Iron and steel rates were touched upon very lightly during the session just adjourned. An advance of 5 per cent would increase the iron and steel rates from Chicago to Missouri River points about 2c., that is, the rate would then be approximately 44c., rather than 42c., as under the present rates. The rate from Chicago to St. Paul and Minneapolis would advance from 31½c. to about 33c. and to Denver from 83c. to approximately 87c.

Railroad security holders supported the plea of the Western carriers for a horizontal increase and thus brought to the commission's attention a nation-wide movement to protect investors. The carriers, in presenting their case, testified that practically one-fifth of the investment in the Western railroads brought no financial return in 1924 and that on the remaining four-fifths the net return was smaller than earnings on the total investment in 1916.

A schedule for subsequent hearings of shippers in rebuttal has been arranged as follows: St. Paul, Nov. 9; Denver, Nov. 16; San Francisco, Nov. 23; Dallas, Dec. 2; Kansas City, Dec. 14. Final arguments will be made before the commission as a whole in Washington.

Moderate Business Expansion Anticipated for the Remainder of the Year

But Present High Levels of Production Make Large Increase in
Physical Volume Unlikely: Steel Barometers Favorable

BY DR. LEWIS H. HANEY

DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

AN appraisal of the favorable and unfavorable factors confirms the opinion that business will expand moderately during the remaining months of 1925, but raises questions as to how great the improvement will be and how long it will continue.

It is clear that both the capacity to produce and actual current production are so large that the amount of further expansion is likely to be disappointing to the optimist. The average level of manufacturing production in July reached the high point of the year and was practically the same as at the peak in 1923. According to the Bureau of Labor statistics over 7000 establishments in 62 industries reported an average of 94 per cent of full-time operation in August and employed an average of 85 per cent of their full normal labor forces. Not only is the output great, therefore, but it seems probable that working at full capacity the manufacturing establishments of the country would turn out a much larger quantity of goods than could be absorbed at a profit. Moreover, stocks of manufactured goods, though reported to be decreasing, are still so large on the average as to make much expansion in production undesirable for the average industry.

As to the duration of the upward movement important considerations are the progress of speculation, the development of building activity and the trend of the money market. While speculation in commodities is not much in evidence, the real estate and stock markets are in a more dubious position. The number of real estate transfers in 41 representative cities appears to have broken all records in July. In August contemplated construction broke all previous records.

In the stock market, two-million share days have put in their appearance and cautious observers regard

price levels among the speculative favorites as being very high. The public is clearly entering the market and brokers' loans are at a high level. The volume of new business enterprises being established and issues of new securities have increased extraordinarily. Talk is heard of over-extended installment buying (notably of automobiles). It may be said, therefore, that while no speculative fever prevails in the general business body, certain parts of it are affected rather acutely.

Money Rates Trend Upward

AS to money, there is as yet no sign of strain in open market rates in spite of the growing movement of cotton and grain. Nevertheless, the general trend of commercial paper rates has been upward, when allowance is made for seasonal variation, and in August the average was the highest since May, 1924. The chief danger to business expansion in this field probably lies in the rather low yield on stocks, bonds, etc., due to high prices quoted on securities and similar paper. Judging by the past, when yields decrease to a point where they are less than open market money rates, speculation will be checked. Such a development may not be far distant.

Nevertheless, there seems to be no danger of a sharp run-up in money rates. The forces making for easy money are the relatively high reserve ratio and the lenient policy of those in control of the banking situation. No indication of a crop-moving strain is apparent, and adequate railroad transportation, together with the absence of speculative forward buying, tend to reduce commercial borrowing. The strong cash position of many large corporations is notable.

On the other hand, the reserve ratio is steadily declining and bank credit is largely extended. It seems

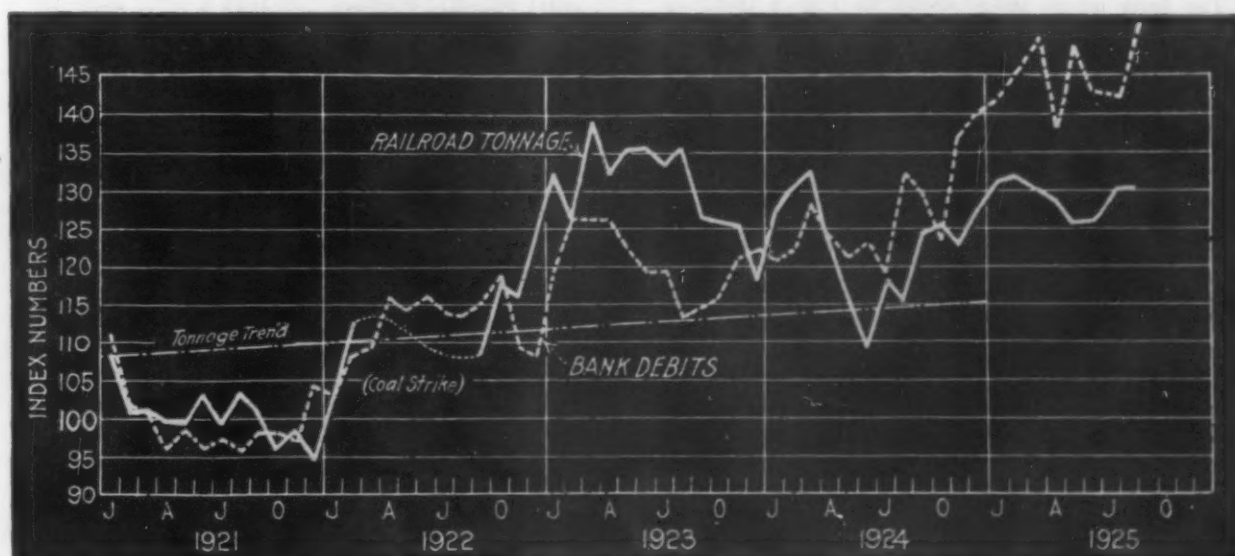


Fig. 1—The Volume of Freight Being Moved Over the Railroads Is Evidence of the Continued High Consumption of Commodities; the Unusual Increase in Bank Transactions May Be Partly Due to Speculation

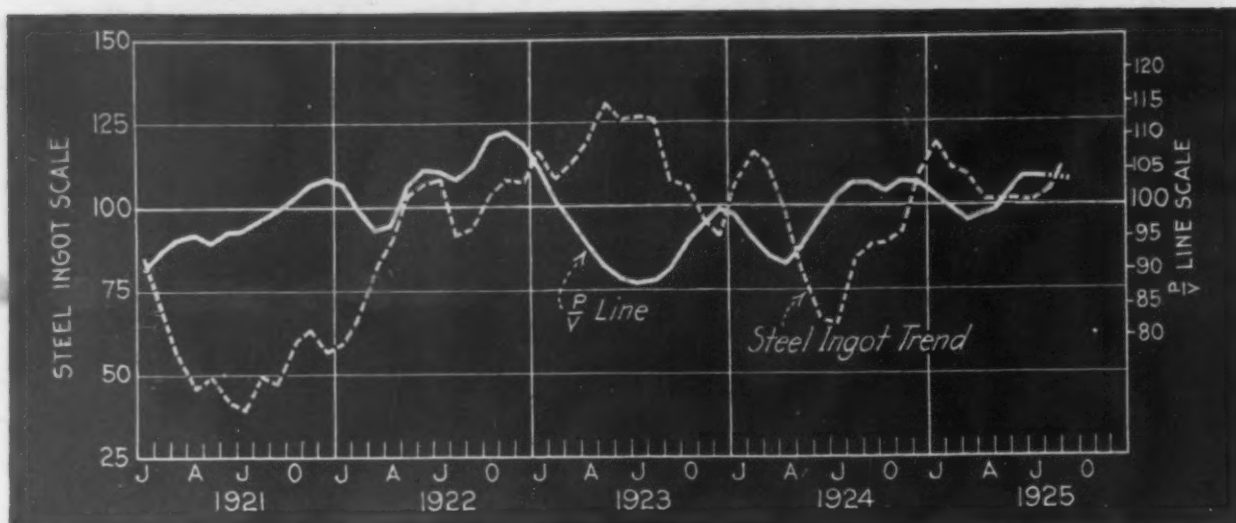


Fig. 2—The Trend of Steel Ingot Production Is Distinctly Upward: The Advance in the P-V Line Has Been Checked, at Least Temporarily

probable that money rates will continue to firm up and, if commodity prices advance, rates will reach higher levels before the year is over.

On the whole the situation does not appear to encourage hopes that business expansion can long continue sharply upward.

Freight Records Broken

THE position which business now occupies in the cycle is of great interest. In Fig. 1 are shown two indexes which best reflect the general situation in this regard. In August the tonnage hauled by the railroads held at a high level without much change from July. This level was high, not only in comparison with past tonnage, but also in comparison with the long-time normal growth of such tonnage. It is clear that according to this index business is well along in a major upward swing in a cycle which began about the middle of 1924.

It is worth noting that not only did the number of cars loaded break records in some weeks of August, but that the number of tons per loaded car has also been increasing, the average in July having been 27.3 tons against 26.9 tons in June.

The peak of railroad tonnage usually comes in October and, in view of the moderately favorable outlook for business expansion, there is no reason to expect anything different this year. This means that average railroad earnings (and probably purchases by railroads) will be satisfactory.

The bank debits index shown in Fig. 1 indicates that there was a recovery in August from the irregularity of the early summer months. The weekly average was only \$10,600,000,000 against \$11,000,000,-

000 in July, but this decrease was much less than usual and the adjusted index registers 153 against 142 in July, the monthly average for 1921 being 100. This is the highest point in recent years.

The hypothesis suggested by the foregoing is that business is now in a cyclical upswing which will probably reach the peak in the first half of 1926. As has been the case in recent years, the situation represents a conflict between inflationary tendencies and the depressing effect of over-production of commodities. Were it not for the fact that the supply of goods is so large and so easily increased, commodity inflation would undoubtedly make considerable headway.

Higher Ingot Output Indicated

THE P-V line shown in Fig. 2 ceased to rise in August. Temporarily, at least, the favorable forecast which it has been making in recent months has come to a close. It indicates that there is now in prospect a closer adjustment between supply and demand and that the basis for further expansion is not so strong. In the past this line has forecast the trend of business by from four to six months. Accordingly it will be inferred that the present expansion is not likely to assume boom proportions and that there will be at least a temporary check early next year.

As usual, steel ingot production is following the trend of the P-V line with a lag of from two to three months. We may, therefore, expect a further increase in ingot output next month, making due allowance for the usual seasonal changes, but that a little later the increase will be checked. As ingot output is already somewhat in excess of estimated normal requirements, while the average price of finished steel products is not

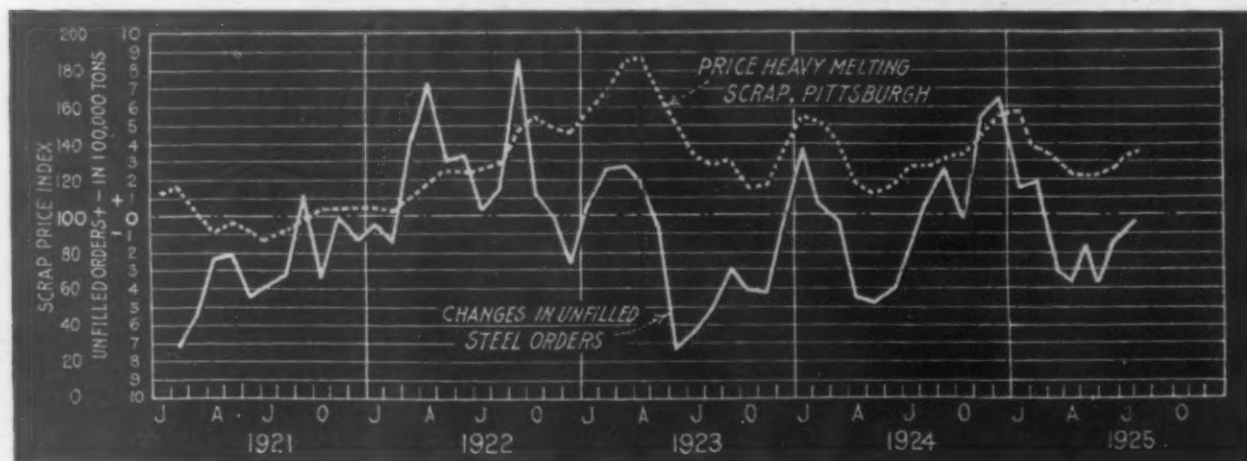


Fig. 3—Both Steel Barometers Indicate Improvement in the Industry: Improvement in the Unfilled Tonnage of the Steel Corporation Is Anticipated

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Prompt production plus fast shipments have lessened forward buying of steel.—And purchasers who formerly depended on foresight for profits find conditions radically changed.—Page 838.

Business will improve somewhat for the rest of the year.—But present high production levels in basic industries make large increase in physical volume unlikely and undesirable.—Page 833.

Manufacturers appeal to railroads to cease production of bolts and nuts.—Claim present competition uneconomic and expensive in view of 40 per cent excess capacity of industry in time of normal demand; confident large savings would result to carriers.—Page 831.

Believes Japan will abandon more ambitious projects in iron, steel and machinery.—F. R. Eldridge, of Department of Commerce, thinks conditions operate against establishment of these industries; Japan will consequently depend upon United States for great part of needs in these lines.—Page 839.

Fluoroscopic examination of steel castings may furnish practical method for detection of slag and blowholes.—X-ray method detects isolated defects having a diameter as small as 1/10 the thickness of the part examined.—Page 802.

Belgian smelters buying American zinc ore to keep plants at capacity.—Consequently smelter prices here are affected by European market.—Page 839.

Ingenious set-up of mold devised for casting iron dryer rolls.—Collapsing core barrel is used; core removed through manhole in head.—Page 800.

Core room placed on mezzanine floor above sand mixing equipment to save space.—Rearrangement of Pettibone Mulliken steel foundry embodies novel features.—Page 795.

How progressive foundries save time and money cleaning castings, moving flasks, handling sand, etc.—A score of helpful photographs.—Page 812.

Steel treaters hold record-breaking convention in Cleveland.—5400 attend technical sessions and exhibits; complete report including discussions.—Page 805.

Three new devices for measuring hardness exhibited at Cleveland.—Dr. Sauveur presents the "durometer" and O. W. Boston exhibits two English testers of Brinell type.—Page 806.

Machine tool builders said to pay too much attention to single-purpose machines.—Automotive industry has need for multi-purpose machines, says R. M. Hidey.—Page 841.

Five weak points often encountered in machine tool design, says W. G. Careins.—Countershaft or motor mounting carelessly designed; pump for cutting oil hard to prime or too small; cast iron gears in head or feed as well as cast iron cams and levers; too many points for applying lubricant; lack of accessibility for repairs listed as weak elements.—Page 842.

Electric arc used to keep ingot tops hot save 85 per cent of portion previously rejected.—Ten per cent more usable tonnage obtained from each heat.—Page 828.

Heating of ingots by electricity should not be judged on fuel costs alone.—Less scale when this method is used; lower cost in chipping yard may offset higher fuel charge.—Page 829.

"When ratio of productive men to inspectors does not exceed 15 to 1 no excuse exists for failure to maintain standards."—Says automotive engineer, describing system budgeting inspection time against productive time.—Page 842.

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Special Consideration of the Foundry

THE IRON AGE presents in this issue a number of unusual contributions on the modern foundry. The space saving rearrangement of equipment at a steel foundry is graphically shown in the photo-story which leads the issue. A description of the fluoroscopic method for examining castings for blowholes, a discussion of the points involved in casting special rolls—these are among the helps and guides with which the progressive foundryman must keep acquainted.

A score of photographs have been included in a special insert to show how up-to-date plants are saving time and labor in handling sand, cleaning castings, moving flasks, etc. The coming convention in Syracuse will be covered in detail by members of THE IRON AGE staff, as were last week's meetings of the American Society for Steel Treating reported in the current issue.

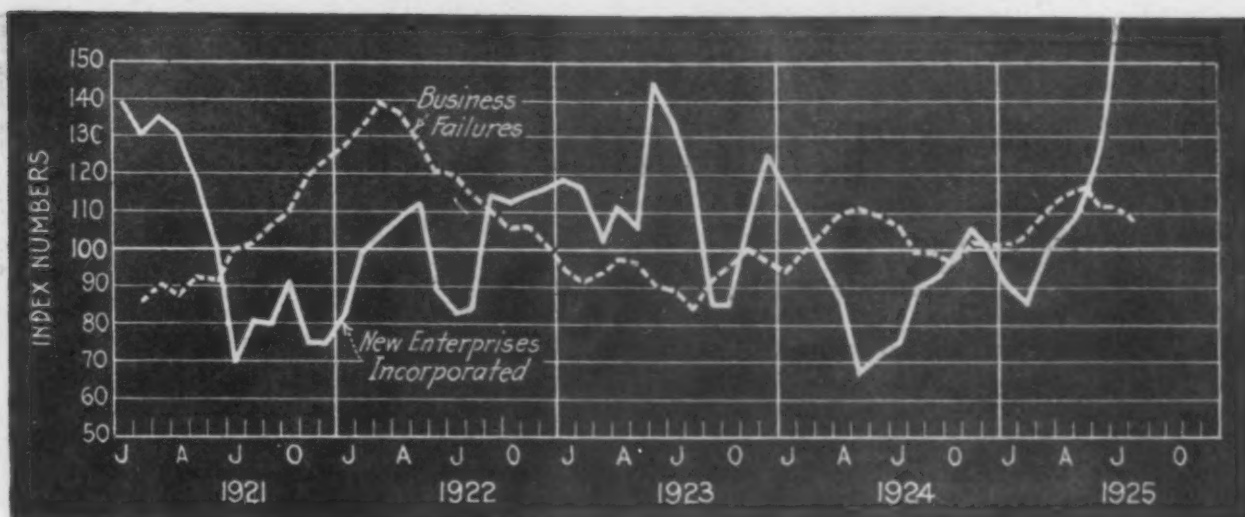


Fig. 4—The Remarkable Jump in the Capitalization of New Enterprises Brought the Total to the Highest Point in Years, Last Month

very strong, such a development is certainly desirable from the standpoint of the steel makers.

Steel Barometers Favorable

FIG. 3 shows the trend of two steel barometers, which are also of value in forecasting the general development of business. Both of these barometers rose in August, thus forecasting further improvement in the steel industry and probably in general business.

Figured on a rate-of-change basis the unfilled orders of the Steel Corporation made a favorable showing in August. There was a decrease, but it was much smaller than in the preceding month.

The average price of heavy melting steel scrap at Pittsburgh was \$18.80 in August against \$18 in July. The September average will probably be near \$19. The scrap market, however, has recently not been so strong and some observers are looking for a lower trend.

New Enterprises Increase Sharply

THE outstanding fact revealed by Fig. 4 is the startling gain in the volume of new business enterprises as measured by the capitalization of newly incorporated companies. In August the highest point in years was reached. Under the influence of advancing commodity prices and the low open market money rates, enthusiasm in starting new enterprises appears to be reaching a rather dangerous level. In the past such high points as that attained in August have usually been followed in a few months by reaction.

The failure situation is distinctly encouraging as there has been a steady decrease for three months in the number of business failures—making due allowance for seasonal variation. Apparently liquidation caused by the irregularity and recession of the spring has come to an end.

The Iron Age, September 24, 1925

Silence and Discretion Prove Valuable Business Assets, Says Judge Gary

In an address delivered to students of New York University, Sept. 21, Judge Elbert H. Gary, chairman of the United States Steel Corporation, pointed out that silence may very literally prove to be golden to the young man who cultivates a close mouth. "Much of large business is negotiated," he said in part, and "many of the biggest commercial transactions result from discussions between two or more persons, dealing at arm's length, having no fixed prices or exact basis for measuring or valuing, and depending entirely upon reaching an agreement which is mutually acceptable. Neither side is under moral obligation to expose what is in the mind as an ultimatum or maximum. In such cases there is no reason for disclosure of the mental operations, though of course there can be no justification for misrepresentation or fraud of any kind. Here is opportunity for discretion and sagacity. A wise father used to say to his sons: 'Remember as you go through life every man you meet in business is a little smarter than you.' This idea is worth remembering."

"The average man talks too much, especially if he has a good command of language. It is well to let the other man talk half the time. Each one is trying to 'size up' the other before naming figures or stating final conclusions. 'A wise man keeps a close mouth.' In an extended discussion the experienced and wise man, if he is a good listener, is able to determine with considerable accuracy something of what is in the mind of the other man. One should carefully weigh every word that is uttered by oneself and by the other person as well, and in doing so can also form an intelligent opinion of the integrity of the other and the reliability of a statement that the offer made is the 'last

dollar' that will be paid or accepted, as the case may be.

"One can be truthful and specific in a business transaction, and perhaps at the same time save a good deal of money by silence and discretion."

Industrial Advertisers to Meet

The fourth annual convention of the National Industrial Advertisers Association will be held at Hotel Chalfonte, Atlantic City, N. J., Oct. 19, 20 and 21. Among the subjects to be discussed which are of interest to all industrial advertisers are the following: Market research; marketing; effective distribution; tie-up with sales department; securing facts and figures from the field; relations with field and customers; national vs. sectional advertising; trade paper advertising; direct mail advertising; reference catalogs and trade directories; manufacturers' and jobbers' catalogs (how to make these do better jobs); industrial motion pictures (how difficult subjects are covered—and costs); advertising for customers' industries (why and how to use good will advertising); house organs (purposes and methods of reaching objectives).

The recently organized open-hearth committee of the American Institute of Mining and Metallurgical Engineers will hold its first technical session at the Hotel Cleveland, Cleveland, Oct. 13, 14 and 15. A meeting of the Ohio section of the institute will be held the same date. J. V. W. Reynders, 120 Broadway, New York, president of the institute, is chairman and Lewis B. Lindemuth, 40 Wall Street, New York, is secretary of the committee.

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Steel Trade Changes

APPEARANCE of rail buying for the new year makes timely a reminder that tonnage concepts in steel must be kept under constant revision or error will be made in judging the importance of market developments. While the total demand for steel has been increasing, the proportions of steel used in different lines have been changing, so that some outlets grow more important and some less important.

Time was when the character of a steel year was determined largely by the total of rail orders; but not so today. One change is that little new track is laid now; also, the consumption of steel in other lines has increased greatly. Since 1906 the production of steel has almost doubled, yet in no year has there been so heavy a rail production as in 1906. There was much laying of new track in that year, and there was much replacing of rails because of heavier rolling stock. With improvements being made in steel, it is conceivable that there may yet be a great increase in railroad traffic without the necessity of the mere tonnage of 1906 ever being reached.

Specifically, replacement requirements, represented by the rail orders of various roads, run between 1,500,000 and 2,000,000 tons per annum. The higher figure is less than 5 per cent of the total steel capacity and the lower one is less than 5 per cent of the maximum tonnage of rolled iron and steel ever produced in a year.

It used to be said that when the voice of the riveting machine was heard in the towns the country was prosperous. That was true, and doubtless it is true now, but it is true in the sense of being an indicator, rather than in the sense of any very large steel tonnage being thereby absorbed. The total of fabricated structural steel runs nearer 5 per cent than 10 per cent of the total rolled production.

In another important respect old habits of thought must be shaken off—the idea that steel buyers are alternately accumulating and liquidating stocks. With prompt production and excellent railroad service, buyers do not need to accumulate as once they considered necessary, and on the

other hand they never have large stocks to liquidate. However, it does not follow from this that stocks in hands farther removed from the mill are carried in correspondingly small volume. At times there may be no little steel tied up in manufactured form and not yet in final consumption or use.

One more change, closely related to the last, is impressing itself on the minds of men in the steel trade, and is now a subject of almost daily comment—the continued absence of the old-time buying movements accompanied by vigorous upward swings in prices. We refer not so much to the so-called boom periods, in which profits were realized that compensated for the lean times that came between, but to the old familiar phenomenon of forward buying—generally competitive buying—accompanied by price advances, as steel users made sure of getting all the steel they would need and as they needed it. President Graham, of the Bolt, Nut and Rivet Manufacturers' Association, refers to this disappearance of speculative buying in his very significant review of the situation in his industry, printed elsewhere. Those users of steel who always bought heavily before the old-time advances started, and depended on their foresight in buying for no small share of their profits, chafe under the lock-step markets of today, in which one buyer fares about as well as another. Probably no other change of the years since 1920 is just now causing so much questioning in the minds of steel producers and steel consumers as to its effects in the immediate and farther future.

Steel Treathers' High Mark

NOTABLE in two respects was last week's Cleveland convention of American steel treathers: the exceptionally earnest and capable men who took part and the quality of the papers.

Seldom has so large a group of scientists discussed important heat treatment problems. Presided over by some of the most prominent metallurgists of the country, the sessions were fully attended each day, no matter what the conditions or what the range of the topics. The meetings

will rank with the best that have been held in this country dealing with the metals of the greater industries.

The papers were of a high order and the program as a whole has not been matched in years by any of the organizations affiliated with the American steel industry. Six years is a short span, as technical societies go. Early enthusiasms are still strong and there is all the incentive of novelty.

Yet a note of warning is in order. The society was started by practical men, who had developed creditable skill in the mill and forge shop. How will they look on the continued predominance of highly technical papers and such a paucity of the more practical ones as was noticed last week? The Iron and Steel Institute (London) and the British Institute of Metals have made some regrettable precedents in this respect and their significance should not be missed by the program makers of this vigorous American organization. There is research and research. But much of it is of limited appeal and therefore has little claim on the time of a convention set for the advance on practical lines of so high and indispensable an art.

The Prospect for Spelter

ZINC ties closely with iron and steel manufacture in the matter of galvanizing. Out of a total domestic consumption of 535,000 tons of spelter in 1924 the galvanizers used 240,000 tons, whereof a little more than one-half was required for the galvanizing of sheets. In Great Britain and other foreign countries galvanizing also accounts for a large proportion of the spelter consumption. The prospects for spelter, especially in respect to production and price, are therefore of concern to an important part of the steel industry.

Spelter is rather unique among non-ferrous metals in that it is produced extensively in countries other than those having ore. The United States derives its supply from its own ore, but the smelters of Belgium work wholly on imported ore. The statistics of spelter production are misleading, therefore, if these conditions be not well understood.

The countries from which the zinc of the world originates, stated in their order of importance, are the United States, Australia and Upper Silesia, besides about twenty others, none of which produces so much as 50,000 tons a year. In recent years the mainstay of supply outside of the United States has been Australia; but that country has been delivering concentrate accumulated during the war, and the current production of its mines has fallen to less than one-half the rate of ten years ago.

With the depletion of the accumulated stocks, the expiry of contracts with Belgian smelters, and the ear-marking of the Australian supply for British and colonial use, the zinc smelters of the Continent have found themselves hard pressed. The Belgians in particular have been scouring the world for ore and have bought it extensively in the United States, Canada and Mexico, in this country taking it out from the Joplin dis-

trict under the very noses of American smelters. This is not to our liking, for if Europe needs zinc we should prefer to supply it in the form of spelter rather than ore. However, we cannot help ourselves in a condition where foreign buyers may take our ore at a loss, making this up out of their less competitive ores, for the sake of operating their plants at full capacity.

The developed resources of zinc ore in the world are none too great. There are only a few major mines, such as the Sullivan in British Columbia, Anaconda's group at Butte and the Bawdwin in Burma, that are capable of increasing their production substantially. Each of them is taking active and effective steps to do this. A large part of the world's zinc supply comes in dribblets from many small mines, and such countries as Spain, Italy and Sweden that contain them do not seem to be able to increase their outputs materially.

In some respects the situation in zinc is analogous to that which has existed for a long time in lead. There will be plenty of zinc to be had. The world's production will increase steadily in tune with the natural increase in consumption. But the zinc smelters of Europe will have to go further afield for it—to such countries as Bolivia, China and Mexico—and they will have to offer prices that will bring it out from remote and difficult places.

The American zinc market is now so interlocked with the European that exigencies of the latter will continue to be reflected here. We express no opinion as to the price for zinc at the moment, whether it is too high or too low, but it seems clear that the metal is destined to run on a higher economic level than in the past, just as has happened with lead.

Japan's Future in Steel Products

F. R. ELDRIDGE, chief of the Eastern Division of the Bureau of Foreign and Domestic Commerce, who returned recently from a tour of the consular offices of the Far East, is convinced that Japan will abandon its more ambitious projects in iron and steel, machinery, automotive and railroad equipment lines. He believes that the island empire will continue to look to the United States for a great part of its needs in these manufactures.

Writing in *Commerce Reports*, Mr. Eldridge reviews the marked development in the past fifteen years in Japanese manufacture, particularly under the stimulus of war conditions, including the iron and steel industry in its various ramifications. In the war the South Seas and India, cut off from their customary supplies of manufactured goods from America and Europe, opened up a quick and profitable market for Japanese products. A great export trade resulted, the demands of which, however, were met only by heroic efforts toward standardizing industries, most of which had been conducted as small units. There were exceptions, the textile industry, for instance, having been established on a modern basis. But, on the whole, the handicap was a serious one.

"It was obviously impossible," writes Mr. Eld-

ridge, "to achieve complete standardization. The permanence of the market for Japanese goods, therefore, was considerably affected, and as soon as Europe was in a position to enter its lost fields Japan suffered a serious curtailment in the export trade of its newly expanded industries." This, the writer explains, was a principal cause of the Japanese slump of 1920, which carried in its trail a price deflation and depression of serious consequences. Heroic Government measures, including the formation of the silk pool and the Wednesday Association of copper producers, saved industry from complete demoralization and market prices are now well above cost of production and are more or less stable. Mr. Eldridge's conclusions are of special interest in view of the commonly expressed opinion in the machinery trade, for example, that the day is coming when Japan's cheap labor will drive American machinery out of the Far Eastern market.

"Japanese manufacturers have learned a lesson, and a general movement toward amalgamation and concentration in industry is under way. It is already evident that many of the industries founded on war demands cannot survive even under amalgamation and protection, because of the lack of raw materials, suitable labor, or a market extensive enough to make large-scale production profitable. As a result we may witness a concentrated movement to build up strong units in such industries as electrical supplies, cotton textiles, silk textiles of the cheaper grades, certain chemical industries, certain types of paper of the better grades, matches, toys, and cheaper glassware, and an abandonment of more ambitious projects in the iron and steel, machinery, automotive, railroad equipment and similar fields, except such Government mills and workshops as are deemed necessary for national welfare."

Less Automobile Production

AUGUST output of automobiles, according to the Department of Commerce report, showed a greater decrease than had been commonly assumed. Any improvement reported since then is less significant, therefore, because it is predicated upon this lower rate.

The August figures are as follows: Passenger cars, United States, 214,326; Canada, 7430; trucks, United States, 36,207; Canada, 1436; grand total, 259,399.

Production at various times is more readily

depicted by the use of relatives. The Government statistics begin at the middle of 1921, and the total for four years, through June of this year—passenger cars and trucks in the United States and Canada—makes an average of 279,674 a month or 3,356,088 a year. Calling this 100, the relatives for calendar years have been as follows:

1922.....	79
1923.....	122
1924.....	108

The latter half of 1921 was a very poor period, and 1922 was not good, so that the basis of the relatives is pulled down. The automobile trade, being sanguine, would be disposed to compare outputs with high rates rather than with average rates, whereby its figures would make a poorer showing than relatives computed as above.

Production in the first eight months of this year is represented by a relative of 127, April, the record month in the trade's history, showing 156, while August now shows only 93.

Thus last month's production was 7 per cent under the four-year average, which included a period of very light production, was 41 per cent under last April's high record, and was well under the averages of either of the past two years.

Comparisons of different months are not fruitful, because different policies have been pursued in production. For the spring season of 1924 there was much anticipation in production, large numbers of cars being accumulated, so that in April, May and June production successively fell off, when requirements were increasing.

This year, on the other hand, production has been aligned closely with sales and hence may be taken as indicative of sales. April was the high month, each of the next three months showing only a slight decrease, the big decrease coming in August. A different view may now be taken of some of the price reduction announcements, such as ran to the effect that there was no occasion to reduce prices to influence sales, the public merely being given the benefit of economies brought about by heavy production. The public paid the higher prices when there was heavy production, while the lower prices obtain when production is lighter.

Argument that the automobile is less a seasonal affair than has been supposed are not supported by the latest statistics. It might, perhaps, better be said that the makers are removing their own artificial influences to make sales seasonal, by departing from the custom of bringing out annual models and of changing their prices at certain times.

Changes in Geological Survey Personnel

Director George Otis Smith of the Geological Survey has commented recently on one phase of the transfer of the Bureau of Mines to the Department of Commerce. When the change was made, the gathering and publishing of statistics on the mineral resources of the United States, which long has been in charge of the Geological Survey, was given over to the Bureau of Mines. This involved transferring from the Geological Survey to the Bureau of Mines the employees of the Division of Mineral Resources. However, some of the specialists who have worked on mineral resources for a good many years are remaining with the Geological Survey. These, having given up their statistical work, will devote themselves to research work in various

lines, to which they will now be able to give undivided attention. Director Smith explains that their retention in the Survey only emphasizes the importance of their scientific research and predicts that the results will be of great benefit to the mineral industry.

A meeting of the administrative board of the American Engineering Council will be held in Columbus, Ohio, Oct. 29 and 30 under the auspices of the Engineers' Club of Columbus. James Hartness, president of the Jones & Lamson Machine Co., Springfield, Vt., and president of the council, is expected to preside. Chief among the topics to come before the board is the study of commercial aviation now being made by the council jointly with the Department of Commerce.

Automotive Engineers at Cleveland

Machine Tool Selection, Maintenance and Safeguarding Discussed at Production Meeting—Inspection Methods and Sheet Steel Fabrication

LARGE attendance, a full program and active participation in discussion marked the annual meeting of the production section of the Society of Automotive Engineers held at the Hotel Winton, Cleveland, Sept. 14, 15 and 16. This meeting, held simultaneously with that of the American Society for Steel Treating and the Steel Machine Tool Exposition, reported on other pages, afforded unusual attractions to the participants.

The automotive group not only joined with the steel treaters in general activities, but in visiting the exposition were able to witness the production possibilities of a large number of late models of machine tools, many of which were in operation on automotive work. Large displays of steel and alloys, of heat treating, testing and other equipment were also to be seen.

Of six technical sessions, two were devoted to machine tool equipment and one each to sheet steel fabrication, inspection methods, gear production and foreman training. The annual dinner, with K. T. Keller, vice-president and general manager of the General Motors of Canada, Ltd., as the principal speaker, and H. L. Horning, president and general manager of the Waukesha Motor Co., Waukesha, Wis., and president of the Society of Automotive Engineers, presiding, was well attended.

Criticism, Adverse and Otherwise, of Machine Tool Builders

"Machine Tool Needs of the Automotive Industry" was one of the subjects most actively discussed, a paper under that title being presented by R. M. Hidey, White Motor Co., Cleveland. It was held by Mr. Hidey that the automotive industry has been responsible for most of the development in the machine tool industry during the past fifteen years, and that the friendly cooperation which has existed between the two industries is responsible for the success of both.

Too much attention has been paid by the machine tool industry, said Mr. Hidey, to single-purpose machines which satisfy the demands of only those concerned with a large production of a limited line. There is a real demand in the automotive industry, he said, for multi-purpose machines upon which jobs can be easily changed, or the machine used in another department or even in another plant. Standardized machines fitted with special tools for a variety of jobs should be cheaper to build and operate, he thought, and would be a source of profit to the builders and to the automotive industry.

The failure of machine tool builders adequately to equip machines with safety guards was pointed to as increasing installation costs to an uneconomical extent.

It was said that the cooperative spirit found in the automotive industry does not exist in the machine tool industry. "However much they have cooperated with the automotive industry," said Mr. Hidey, they themselves have not gotten together with a comparable spirit for the working out of mutual problems. The desire to excel has predominated to the exclusion of the cooperative spirit, which would have resulted in stabilizing the machine tool industry." It was also pointed out that the automotive industry spends millions yearly in designing and experimenting, while the machine tool industry is not spending a proportional amount on development of machine tools. "Especially has the burden of testing," he said, "a burden which should properly be borne by the builder, been thrown upon the buyer."

The progress of the work of the committee of the American Society of Mechanical Engineers and the National Machine Tool Builders' Association in the standardization of T-slots was commended and it was said that the automotive manufacturers would be pleased to see standardization worked out for spindle noses, turret holes, lead screws, working heights and standard machine data sheets. The balancing of moving parts was said to have been neglected by machine tool builders. Gears, wheels and shafts were said to be

seldom balanced, and the vibration frequently excessive, decreasing the life of the machine.

Mr. Hidey's paper was ably discussed by several machine tool builders. A. C. Cook, vice-president Warner & Swasey Co., Cleveland, in touching on the lack of cooperation between the builders of various types of machine tools, said that there is not the opportunity for such cooperation in the machine tool industry as there is in the automotive field, due to the very nature of the industry itself. The National Association of Machine Tool Builders as a group cooperates on various matters, he said, but it is obvious that the manufacturers in the different groups represented in the association must cooperate among themselves in order to obtain the best results applied to their own particular types of machines. Makers of drill presses cooperate together, the same as the milling machine manufacturers. "The only problem which is common to all the groups is the problem of removing metal and there is a good interchange of information and experience among the various groups along these lines," said Mr. Cook.

In discussing the problem of designing and experimenting, Mr. Cook stated that he thought that the majority of manufacturers experiment long and carefully with a new product before placing it on the market. A case was cited of a new machine which was a refinement of an earlier design having been tested by the builder for nearly two years before being placed on the market.

The question of standardization, characterized as a knotty problem, was also taken up by Mr. Cook, and on safety devices, he said that they are being built more and more into machine tools. Attention was called to the standard data sheets adopted by the National Machine Tool Builders' Association some time ago.

E. F. DuBrul, general manager of the National Machine Tool Builders' Association, in discussing Mr. Hidey's paper, took up, among other things, the problem of safety guards for machine tools. He pointed out that in some cases what the safety code of one State specifies, that of another State prohibits. Digests of the codes of each State were not available, he said, and before safety guards that satisfy all codes can be provided, it is necessary to know what these safety codes require. Excessive variety of available sizes of some classes of machine tools was said to be the result of demand from buyers, and much discussion followed Mr. DuBrul's statement to the effect that standardization will follow the demand of buyers for it. F. E.

Cardullo, chief engineer G. A. Gray Co., Cincinnati, and E. P. Blanchard, Bullard Machine Tool Co., Bridgeport, were among others entering into the discussion.

Factors in Selecting Machine Tools

Some of the more concrete factors which should be given consideration in the selection of machine equipment were outlined in a paper by W. G. Careins, Ajax Motors Co., Racine, Wis. Users of machine tools were divided into three classes: Job shop work; semi-production shops in which there is more or less duplication of parts, the production being subject to many changes of design or product; and the manufacturing plant engaged in intensive production of a standardized product.

After determining into which of these three classes the machine tool requirements fall, factors to be considered are the production required, the period over which it will be maintained, and also the possibility of a gradual or rapid increase in demand. Methods of machining to be used, inspection of tolerances and quality of finish required are to be considered, as well as the possibility of changes in design, which would make obsolete special machines or expensive tooling. In estimating cost of producing a part on a special machine, it was said that the depreciation factor should be about twice as great as that for standard machines, because changes in design of product are likely to bring about obsolescence before the machines are worn out. A higher maintenance cost should also be figured because of the difficulty and expense of making repairs. The question of delivery of the machine equipment was another factor mentioned, because if needed at once, the possibility of purchasing special equipment is eliminated. The problem is solved by purchasing standard machines that can be converted to other work later when the special machines are ready for delivery.

A factor stressed as of considerable importance in the final selection of machine tools is the standardization of equipment. If several machines of a particular make are in the shop, it is often economical to continue to buy that make and size of machine, as all attachments and fixtures can be interchanged from one machine to another. Stocks of repairs carried could, in this case, be considerably reduced. Floor space available was pointed to as sometimes an important item in choosing machine tools.

Weak Points That May Give Trouble

Several weak points in design and workmanship commonly encountered in machine tools were discussed by Mr. Careins. Frequently a countershaft is furnished by the builder that does not measure up to the standard of the machine, or the motor mounting is an afterthought in the design. The pump for the cutting lubricant is difficult to prime or is of insufficient capacity. Cast iron gears in the head or feed mechanism were said to be almost always a source of trouble, the same being true of cast iron cams and levers. Having a large number of oil cups and holes instead of lubricating all possible parts of the machine from a central point was emphasized as another weakness. Lack of accessibility for making repairs was characterized as a serious fault, it being often necessary to disassemble almost completely a machine to make some minor repair or adjustment.

Keeps Check on Machine Repairs

"An Analysis of Machine Tool Maintenance," a paper by A. R. Kelso, works manager Continental Motors Co., Detroit, was accepted as another valuable contribution to the meeting. Analytical tables based on data collected from a five months' study were given, eight types of machine tools being considered. A maintenance budget system was described that has been in operation in one plant to give the men a comparative idea of particular equipment that is running in excess of the budget time. It also serves as an inspection of the condition of the equipment and indicates when an overhauling is advisable. The necessity of keeping equipment in first class condition if the cost of repairs is to be kept down was clearly indicated.

The thorough accident prevention program of the

Buick Motor Co., Flint, Mich., was reflected in a paper on "Making Machine Tools Safe," by R. F. Thalner, safety director of that company. Among general precautions, it was said that drill press operators should not be permitted to wear gloves with long sleeves. In operating a milling machine, a constant source of danger lies in removing chips from the cutter. A brush should always be used for this purpose. Proper grinding of drills was said to eliminate the long ribbon shaving which often causes injury. Hazards connected with lathe operation are the flying chip and the long steel shaving. The latter if permitted to flop around promiscuously may cause lacerations. The hazards connected with punch press work were stressed, the point of operation, or between the dies, being spoken of as the most hazardous part of this machine. The removal of this hazard by building safe dies was advocated, a procedure which not only prevents accidents, but increases production. In the press room, said Mr. Thalner, the big job is safe die construction.

The safeguarding of grinders and woodworking tools was discussed and hand or shock tools, such as chisels, stamps, drills, drifts, etc., were given special reference. What is known as the bulls-eye hammer, which has annular grooves to prevent accidents from mushrooming of the head, is used at the Buick plant instead of a hammer with a straight chamfer head. Proper hardening and balancing of hammers is also given attention. The necessity of educating men in safety first was also covered. "The place to stop accidents," said Mr. Thalner, "is in the design of the die, jig, fixture and machine. Often a hazard is not apparent until the die or machine is put into use. In that case it should be redesigned. If it can't be redesigned it should be guarded."

The application of a drill press to the manufacture of the Ford carburetor was described by R. M. Anderson, Holley Carburetor Co., Detroit. The machining of the carburetor is done by 34 spindles grouped on a cast iron base. The process involves 52 operations, handled by 20 men. All fixtures are bolted directly on the bed and the piece in process passes from one end of the line to the other. A tractor mixing chamber, a larger unit, is machined on a similar line of drill presses. The arrangement and operation of many of the jigs and fixtures were illustrated by lantern slides.

Points on Designing Jigs and Fixtures

Factors to be considered by the tool engineer in designing jigs and fixtures for large or medium production were outlined in a paper on "Jigs and Fixtures Applied to the Machining of Engine Blocks," by J. G. Moohl, Cleveland Automobile Co., Cleveland. Accurate location of the work; firm but rapid clamping facilities and means of loading; reduction of expense by similarity of patterns, bushings and other parts; and the general design of the fixtures themselves were given as among the most important factors. The application of these factors in machining engine blocks at the Cleveland Automobile Co. was outlined. Cooperation between the engineering and tool engineering departments was stressed as of primary importance.

Inspection Methods at Buick Plants

"When the ratio of productive men to inspectors does not exceed 15 to 1, no excuse exists for failure to maintain standards," said C. J. Ross, Buick Motor Co., Flint, Mich., in a paper on "Inspection Methods." Mr. Ross' paper was read by R. B. Schenck, also of the Buick company, at the inspection session, which was presided over by A. H. Frauenthal, Chandler Motor Car Co., Cleveland.

Throughout the works, said Mr. Ross, a certain ratio of productive hours to inspection hours is allowed in each plant, depending upon the nature of the work. This amounts to practically the same thing as working out a budget. Inspection begins in the metallurgical department with the arrival of raw material. Thenceforth all major parts are given 100 per cent inspection with go and no-go gages of the pin and snap types. These were said to give quick inspection and to be considered better than micrometers. Parts either pass or

do not pass; limits are established beyond which they are not allowed to go.

Extensive application is made of spark testing, both of the raw material and of parts coming from the heat treatment. A general survey of the system of inspection was given and lantern slides were shown of special inspection machines and devices that have reduced the amount of labor previously required.

At the same session John J. Feeley of the Glenn L. Martin Co., Cleveland, spoke on "Some Aspects of Inspection in the Airplane Industry."

Scrap from Large Sheets Used for Small Parts

Reduction of cost by utilizing the scrap from large pieces of sheet steel for the manufacture of small parts was outlined in a paper on "Economical Sheet Steel Fabrication" by Syd Smith, Studebaker Corporation of America, South Bend, Ind. Mr. Smith's paper was presented by R. I. Mowrey, also of the Studebaker company, at the sheet steel session, which was presided over by John Jaschka, National Malleable & Steel Castings Co., Cleveland.

Inasmuch as from 25 to 30 per cent of the weight of an average passenger car is made up by the sheet or strip steel used in its construction, and as about 60 per cent of the cost of a piece is in the stock, the opportunity to reduce costs by conserving the stock is apparent. A method of conserving scrap from the sheets was worked out, and information as to the possibility of making a new piece from scrap material can now be obtained from a card index file. Small pieces of scrap are welded together into such regular shapes and sizes of stock as would be suitable for parts such as dust pans, seat pans, etc.

The progress in the production of parts from sheet steel, particularly those used as body parts, was noted, and it was said that greater possibilities exist in this direction even to the extent of making phaeton tops from a single sheet of welded steel. The average cost of the finished sheet metal parts and assemblies in an automobile, including the enameling of the various

parts, was said to be about 13c. per lb. Although sheet metal parts do not compare favorably with iron castings on a basis of cost per pound, they were said to make an excellent showing on the basis of strength cost. The fabrication of several automobile parts, including the shroud, tonneau and side rails, was shown by numerous lantern slides and the manner of assembling the side rails and other parts into the chassis frame was also pictured.

Another paper at the sheet steel session, and presented by G. F. Keyes, Mullins Body Corporation, Salem, Ohio, was devoted to a description of the process of making hot stampings. This process is considerably more complicated than cold drawing stamping, and does not fit in with large production. For small output, or where it is necessary to get into production quickly the hot stamping process was said to be one to be considered. The cost of tools is much less than the tools for cold drawn work. It was said to have been found desirable to combine the use of hot and cold stampings in the same job, making the more difficult stampings by the hot process, which will eliminate finishing or possibly large breakage which would occur if those parts were made cold.

A session was devoted to gear production, Col. H. W. Alden, Timken Detroit Axle Co., Detroit, presiding. Two papers were presented, one of which was on "Coordinating Designs and Production Methods on Gear Development," by P. L. Tenney, Muncie Products Division, General Motors Corporation. The other, by Earle Buckingham, Niles-Bement-Pond Co., New York, was on "The Problem of Gear Production."

One of the best attended sessions, and one at which discussion was most active, was that devoted to training. The papers presented were: "Training of Employees in Production Work," by Mrs. Lillian M. Gilbreth, Gilbreth, Inc., Montclair, N. J.; "Products and By-Products of Foremen's Conferences," by F. T. Jones, White Motor Co., Cleveland, and "The Training of Shop Foremen," by Louis Ruthenburg, Yellow Sleeve Valve Engine Works, Inc.

GERMAN PIPE BID LOW

Gelsenkirchener Works Low on Six Sections for New York

Bids opened Sept. 16 by the Department of Purchase, New York, on about 7000 tons of cast iron pipe, valves, fittings and fire hydrants, resulted in a low bid by the Gelsenkirchener Bergwerks A. G., Dusseldorf, Germany, on six of the 15 sections into which the tonnage was divided. The bidding was unusually close, in some instances only a few cents representing the difference between the lowest and next highest bidders. Should award be made to the lowest bidder, including the German company, the total cost will be \$506,641.44. If the German bid is eliminated, as was done on the previous purchase of pipe by the City of New York, July 20, of this year, the total cost will be \$515,781.43 or \$9,139.99 more.

The Gelsenkirchener Bergwerks A. G. was low bidder on the only sections on which it submitted bids. The next highest bids on these sections were as follows: Sec. 1, 6 to 20-in. pipe, Florence Iron Works, \$78,615.50; Sec. 4, 8 to 12-in. pipe, Warren Foundry & Pipe Co., \$74,166; Sec. 5, high pressure pipe, Warren Foundry & Pipe Co., \$787.50; Secs. 6, 7 and 8, Talladega Foundry & Machine Co., \$18,555, \$30,925 and \$7,980, respectively.

On the other sections the low bidders were as follows: Sec. 2, 6 to 20-in. pipe, United States Cast Iron Pipe & Foundry Co., \$74,568.50; Sec. 3, 4 to 20-in. pipe, John Fox & Co., \$74,880; Secs. 9 and 10, valve box castings, Flockhart Foundry Co., \$38,464.50; Sec. 11, valves, Vogt Brothers Mfg. Co., \$25,061.25; Secs. 12 and 15, valves and double nozzle fire hydrants, Feils Brass & Machine Works, \$59,075; Sec. 13, valves, A. P. Smith Mfg. Co., \$6,009; and Sec. 14, double

nozzle fire hydrants, American Foundry & Mfg. Co., \$26,694.18.

In view of the action of the Board of Estimate and Apportionment on the bids opened July 20, in rejecting all foreign quotations, Commissioner Bowe of the Department of Purchase has submitted the question of award to the board for action, and award is awaiting decision to be made by the board, either on Friday of this week or next. In the meantime specifications for a further purchase are in preparation.

Proposes Bounty to Steel Makers of India

WASHINGTON, Sept. 22.—Giving additional protection to the steel industry of that country, the legislative assembly of British India has passed a measure providing a bounty of 12 rupees per ton up to 6,000,000 tons on steel produced in India, according to a cablegram just received by the Department of Commerce. The bounty is to continue until March 31, 1927, and 1,800,000 rupees must be paid before March 31, 1926.

The Tin Plate Co. of India, Ltd., in recently asking for a further duty on tin plate imported into India, presented a statement of costs of manufacture. According to Assistant Trade Commissioner E. G. Sabine, Calcutta, the cost of 100 boxes of tin plate is 1808 rupees. With depreciation and interest added, the final cost is put at 2269 rupees. The price of imported tin plate, including a duty of 60 rupees per ton, is stated to be 1830 rupees, showing a loss to the company in competition of 439 rupees. The plea contended that with the assistance of a tariff of 104 rupees per ton the industry could eventually be put on a paying basis.

[The rupee is about 36c.]

STEEL CASTINGS IN AUGUST

Bookings Little Over Half of Capacity—Railroad Specialties Are Lagging

WASHINGTON, Sept. 21.—Bookings of steel castings in August amounted to 51,358 tons, representing 51.2 per cent of capacity, according to the Department of Commerce, basing its returns on reports from principal manufacturers representing more than two-thirds of the commercial castings capacity of the United States. Bookings in July totaled 54,474 tons, representing 54.2 per cent of capacity. Of the August bookings, 18,235 tons were for railroad specialties, representing 42.4 per cent of that class of capacity, while 33,123 tons were for miscellaneous castings, or 57.7 per cent of such capacity. Except for May and June, the August figures are the lowest for a year.

During the eight months ended with August of the present year bookings totaled 466,837 tons, of which 182,733 tons were for railroad specialties and 284,104 tons for miscellaneous castings. This is from reports from 68 identical companies with a monthly capacity of 100,400 tons. For the corresponding period of last year bookings totaled 473,250 tons, of which 232,985 tons were for railroad specialties and 240,265 tons for miscellaneous purposes.

August Shipments of Independent Sheet Makers Score Good Increase

August sales of independent sheet manufacturers reporting to the National Association of Sheet and Tin Plate Manufacturers fell off slightly as compared with those of the previous month, the monthly report of that organization discloses. But more than offsetting that loss and at the same time providing a clearer line on actual business than sales, the shipments for last month were almost 20,000 tons greater than in July. The gain in shipments brought about greater use of productive capacity and the month's production, 270,212 tons was almost 24,000 tons greater than in July.

August production represented 87.2 per cent of the capacity of the mills reporting, based on 16 turns a week and 7.65 net tons per turn for sheet mills and 22.635 tons per turn on jobbing mills; the mechanical operation was approximately 82 per cent, which means that actual production was about 6 per cent greater than rated performance. August this year made a very fine showing as compared with the same month last year, with sales, shipments, production and unfilled tonnage items all showing substantial increases.

The August statement makes the following comparison:

	1925			1924
	August	July	June	August
Number of mills.....	699	699	699	686
Capacity per month, tons	409,000	433,600	421,600	401,700
Per cent reporting.....	75.6	75.3	75.7	72.7
Sales, tons.....	239,492	252,871	286,543	207,986
Production, tons.....	270,212	246,404	266,290	190,436
Shipments, tons.....	243,204	223,454	231,006	177,498
Unfilled tonnage, tons..	460,530	475,950	440,687	236,614
Unshipped stocks, tons..	76,101	88,859	80,938	70,094
Unsold stocks, tons.....	38,476	42,081	51,614	42,635
Percentages of Capacity				
Sales.....	77.3	80.1	92.8	71.2
Production.....	87.2	75.5	83.4	65.2
Shipments.....	78.5	70.8	74.9	60.7
Unfilled orders.....	153.9	150.8	142.8	81.0
Unshipped stocks.....	24.6	27.2	25.3	24.0
Unsold stocks.....	12.4	12.9	16.2	14.6

Bundled Sheet Scrap Loaded with Sand

BUFFALO, Sept. 21.—Grand jury indictments are being sought against two officials of the Freedman Iron Co., a Buffalo scrap concern, in connection with irregularities uncovered by detectives cooperating with the Donner Steel Co., following an investigation of bundles of hydraulic compressed sheets which had been purchased by the Donner company.

Four carloads of the compressed sheet bundles were delivered to the Donner plant. While laborers were unloading the fourth car, one of the bundles acci-

dentally dropped to the ground and broke open, disclosing in the middle of the bundle a tin biscuit box filled with sand and flue dust. Other bundles were broken open and were found, it is stated, to have been similarly loaded.

HOT MILL MEN TAKE CUT

Trouble at Wood Works of American Sheet & Tin Plate Co. Settled

PITTSBURGH, Sept. 21.—Trouble which developed at the Wood works, of the American Sheet & Tin Plate Co., McKeesport, Pa., among the hot mill men over the bi-monthly wage adjustment has been settled and the men who walked out last week were with a few exceptions back at work this morning. Although the American Sheet & Tin Plate Co. does not subscribe to the scale of the Amalgamated Association of Iron, Steel and Tin Workers of North America, its wage scales are based upon and usually are influenced by changes in that scale made at the times of the bi-monthly settlements of the association and those manufacturers who sign the wage agreement.

It seems that the company did not change its wage rates following the May-June settlement but continued wages based upon the March-April settlement until the July-August examination was held and the settlement announced. This disclosed that American Sheet & Tin Plate Co. plants would be on a scale 10 per cent above the rate to be paid at mills working under an agreement with the Amalgamated association or paying the Amalgamated scale of wages. Scales at the plants of the American Sheet & Tin Plate Co. ordinarily are 3 to 5 per cent above the Amalgamated scales and in restoring its usual differential, a reduction of about 8 per cent was made last week. This was accepted at all plants except the Wood works and there the hot mill men walked out in protest over the reduction. They returned to work this morning without concession on the part of the company, being convinced that no more remunerative work was available at other sheet mill plants either of the company or of other sheet manufacturers.

Bankers' Sale of 38,000 Tons of Pig Iron

YOUNGSTOWN, Sept. 22.—Hickman, Williams & Co., Pittsburgh, have purchased at bankers' sale upward of 38,000 tons of pig iron from the receiver of the Struthers Furnace Co., Struthers, Ohio. The agreement of sale was consummated the latter part of last week in New York. The iron, embracing roughly 10,000 tons of basic and 28,000 tons of foundry grades, was sold at an average price of \$16.38, furnace yard. The agreement provides, however, that the buyer must pay a loading charge of \$1 per ton to the receiver.

The sale was consummated at the instigation of the Guaranty Trust Co., New York, one of the principal creditor banks. In addition to the iron bought, Hickman, Williams & Co. also purchased 7500 tons of iron ore in bins, paying \$2 per ton, and agreeing to pay an additional \$1 per ton loading charge. The buyer has been acting as selling agent for Struthers iron since the company was placed in receivership and has been selling small lot tonnages each month, chiefly to foundry interests.

The sale provided for deliveries to be made over the next six months, and aggregated \$675,000. It embraced the following items: No. 2 foundry, 20,031 tons; No. 2 X foundry, 2561 tons; No. 3 foundry, 2932 tons; No. 1 foundry, 1538 tons; basic, 7479 tons; off basic, 2000 tons; high silicon iron (gray forge), 1815 tons; high silicon foundry iron, 200 tons.

This sale leaves upward of 16,000 tons of iron still in the yards of the Struthers Furnace Co., this tonnage being under control of the First National Bank, Pittsburgh, and a small amount, less than 200 tons, under control of the receiver. H. W. Grant, president of the City Trust & Savings Bank, Youngstown, is the receiver for the company.

Quiet Features European Markets

France and Germany Hopeful—British Export
Sales Have Hard Sledding—
German Combine

(By Cablegram)

LONDON, ENGLAND, Sept. 21.

IRON and steel markets are quiet and there are few signs of a revival of domestic demand. Export sales of foundry grades are hampered by a continuance of foreign competition. Hematite demand is moderate.

Foreign ore is dull. Bilbao Rubio is held nominally at 20s. to 20s. 3d. (\$4.84 to \$4.90) c.i.f. Tees.

Finished steel is quiet, especially in the shipbuilding departments, and makers are now inclined to grant further concessions. The United Steel Companies, Ltd., is restarting the rail mills at the Worthington Iron & Steel Works, on three weeks' work.

Sheets and Tin Plate

Tin plate bars have been sold at £6 5s. (\$30.25) delivered.

Tin plate makers are to meet Tuesday, Sept. 22, at Swansea to discuss the scheme for pooling of their output. Its adoption is anticipated; meantime, the market is quiet.

Galvanized sheets are firm on continued good sales of small parcels in most markets.

There is considerable Far Eastern inquiry for black sheets. Some business has been done and further sales are anticipated.

On the Continent of Europe

Continental position is obscured by the continuance of the Belgian labor lockout in the Charleroi district. Markets generally are easier, in the absence of substantial demand, and makers compete keenly with each other for orders.

In Siegerland only nine furnaces, out of 29, are now blowing.

It is believed that a definite decision will be reached, by the end of September, on the proposed Krupp, Thyssen, Phoenix, Rheinstahl and Rhein-Elbe trust. There is an unconfirmed report that the proposed group now is negotiating with American, Dutch and English interests for a loan of 150,000,000 guilders (\$60,300,000).

GERMAN IRON BELOW COST

Producers Buy Rather Than Make Foundry Iron
—Dumping and Bounties

BERLIN, GERMANY, Sept. 5.—The market continues dull. A more optimistic attitude toward the future has, however, prevailed during the last fortnight, and an increase of activity is predicted for the fall.

Pig Iron Prices Below Cost

The pig iron market is quiet. The Pig Iron Syndicate decided to retain August prices unchanged through September. The demand from the foundries, which complain of bad business, has declined. A report in late August by Director Dirksen to the Pig Iron Syndicate states that, of 212 blast furnaces in all Germany, about half have been blown out; and that pig iron sales by July sank to about 70 per cent of the average of early 1925. Production cost is increasing, and after pig iron prices were reduced by a few marks per ton in August, those smelting concerns which are interested also in engineering and machine construction found it more profitable to suspend smelting and to supply their own demand for pig iron by buying from the Syndicate. The Syndicate complains that French

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at \$4.84 per £, as follows:

Durham coke, del'd..	£0 19s.	\$4.60	
Bilbao Rubio ore†...	1 0½	4.96	
Cleveland No. 1 fdy...	3 12	17.42	
Cleveland No. 3 fdy...	3 8	16.46	
Cleveland No. 4 fdy...	3 7	16.22	
Cleveland No. 4 forge	3 6½	16.10	
Cleveland basic.....	3 7½	16.34	
East Coast mixed....	3 15	18.15	
East Coast hematite...	4 19	23.96	
Ferromanganese	15 10	75.02	
*Ferromanganese	15 5	73.81	
Rails, 60 lb. and up..	8 5	39.93	to £9 0s. to \$43.56
Billets	6 10	31.46	to 7 5 to \$5.09
Sheet and tin plate			
bars, Welsh	6 5	30.25	
Tin plates, base box	0 19½	4.66	to 0 19½ to 4.72
Ship plates	7 15	1.67	to 8 5 to 1.78
Boiler plates	11 10	2.48	to 12 0 to 2.59
Tees	8 0	1.73	to 8 10 to 1.84
Channels	7 5	1.57	to 7 15 to 1.67
Beams	7 0	1.51	to 7 10 to 1.62
Round bars, ¾ to 3 in.	8 10	1.84	to 9 0 to 1.94
Galv. sheets, 24 gage	16 5	3.51	
Black sheets, 24 gage	11 5	2.43	
Black sheets, Japanese			
specifications	15 5	3.30	
Steel hoops	10 15	2.32	and 12 10* and 2.70*
Cold rolled steel strip,			
20 gage	18 0	3.89	

*Export price.

†Ex-ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports

Foundry pig iron:(a)						
Belgium	£3 2s.	to £3 3s.	\$15.00	to \$15.24		
France	3 2	to 3 3	15.00	to 15.24		
Luxemburg	3 2	to 3 3	15.00	to 15.24		
Basic pig iron:(a)						
Belgium	3 1	to 3 2s.	14.76	to 15.00		
France	3 1	to 3 2s.	14.76	to 15.00		
Luxemburg	3 1	to 3 2s.	14.76	to 15.00		
Billets:						
Belgium	4 12½	to 4 13½	22.39	to 22.63		
France	4 12½	to 4 13½	22.39	to 22.63		
Merchant bars:						
Belgium	5 7		1.15			
Luxemburg	5 7		1.15			
France	5 7		1.15			
Joists (beams):						
Belgium	5 2½		1.11			
Luxemburg	5 2½		1.11			
France	5 2½		1.11			
Angles:						
Belgium	5 2½		1.11			
½-in. plates:						
Belgium	6 15		1.46			
Germany	6 15		1.46			
¾-in. ship plates:						
Luxemburg	6 4		1.34			
Belgium	6 4		1.34			

(a) Nominal.

inflation prices now dominate the world pig market. As a result of increasing stocks, several blast furnaces have been blown out in the Siegerland district.

The market for steel is unsatisfactory. The Raw Steel Syndicate decided to retain for September the 35 per cent cut in production fixed for August; but already a further cut is being discussed. The market for semi-finished is dull.

Dumping and Bounties Prevail

Delivery terms have not changed of late, and most rolled wares can be had promptly. Exportation has not increased. It is being done almost exclusively upon dumping or bounty conditions, and at a loss. Consular reports state that Germans are offering iron and steel to South America at 5 per cent below French and Belgian prices and 20 per cent below American and English prices. In view of the fact that German production cost is materially higher than Franco-Belgian, such export is possible only at a loss.

Prices ex-works of the first week of September are, in marks per metric ton, with American equivalents:

Ingots	105	or \$25.41 per gross ton
B'oms	112½	or 27.22
Billets	120	or 29.04
Slabs	125	or 30.25
Wire rods	140	or 33.88
Structural forms	132	or 1.42c. per lb.
Universal iron	155	or 1.67
Bars	135	or 1.74
Bands	160	or 1.78
Thick sheets (over 5 mm. or No. 6½ gage)	150	or 1.62
Medium sheets (3 to 5 mm.)	152 to 155	or 1.64 to 1.67
Thin sheets (1 to 3 mm. or No. 20 to No. 11½ gage)	162½ to 170	or 1.75 to 1.84
Thin sheets (under 1 mm.)	180	or 1.95

These list prices are not always maintained. Bars have been sold at 128 marks; thick sheets, 145 marks; wire rods, 135 marks. All prices are ex-works. The scrap iron market is almost dead. Prices per metric ton are: steel scrap, 56 to 58 marks (\$13.55 to \$14.05); solid scrap, 54 to 56 marks (\$13.05 to \$13.55); blast furnace turnings, 42 to 43 marks (\$10.15 to \$10.40). The price agreement between the Raw Steel Syndicate and the steel-consuming manufacturers has been revised in the direction of increasing the bounty allowed upon steel purchased for manufacture of export goods.

Bounties on Steel for Export

Export bounties fixed for September are 10 marks per ton on ingots, against 5 marks in August; blooms, 15 marks against 5.70 marks; billets, 20 marks against 6 marks; bars, 20 marks against 15 marks; bands, 25 marks against 7½ marks; thick sheets, 12½ marks (no bounty in August); dynamo sheets, 40 marks against 25 marks.

Unemployment Rising in Germany

BERLIN, GERMANY, Sept. 5.—The general industrial position has slightly deteriorated. The uninterrupted labor improvement, which had reduced the number of unemployed from 593,000 in February to a minimum of 193,000 around midsummer, has been followed by a setback, bringing the unemployed on Aug. 15 to 208,000. Conditions in the textile, electrical, paper, potash and many other industries are good and many works have more orders than they can execute. In certain branches high production cost prevents competition abroad. Last month the Luther Cabinet announced a price-reduction program, the chief feature of which is sharper application of the cartels law of 1922.

But the new food duties and the gradual restoration of pre-war house rents tend to increase the cost of living, and wages rise, though slowly. The average weekly wage in 11 branches of industry in July was 43.32 marks (\$10.32) for skilled workers, and 32.51 marks (\$7.75) for unskilled. Average wage in the iron, steel and engineering branches was, skilled, 43.18 marks; unskilled, 29.39 marks. The "Frankfurter Zeitung" publishes the following striking comparison between European and American skilled wages in the metal industries: per week, Germany (Frankfurt), 34.56 m.; France, 37.80 m.; Austria, 34 m.; England, 59.16 m.; United States, 203.30 m.

FRENCH MARKET QUIET

Improved Building Construction and Better Tonnage of Semi-Finished Steel

PARIS, FRANCE, Sept. 4.—Settlement of our debts to the United States and Great Britain constitutes a new danger to the stability of our financial situation, against which it is difficult to find a remedy. The trend here is toward a further rise of the cost of living. This will bring on, in its turn, a further increase in wages and salaries, and so we turn in a hopeless circle.

Coke.—During August the ORCA has received from the Ruhr 230,471 tons of coke, averaging daily 7750 tons. Contrary to what had been expected, indemnity coke has not been modified as to price. But it bears an increase of 0.25 fr. per ton, at 145.95 fr. (\$6.95) in consequence of the ORCA having raised its management expenses to 0.75 fr. per ton as against 0.50 fr.

Pig Iron.—Daily output during July remained at the same level as in June. Production of foundry iron has slightly diminished, in part due to the weakness of inland demand. The entente prices are maintained over September, but these products, according to their grade, may be subject to rebates.

Export is good enough, as yet, but prices have not risen and are at 325 Belgian fr. (\$14.75) for No. 3. There is no change with regard to hematite, as far as business and prices are concerned. Italy absorbs good tonnage; one firm in the South-West region has closed an important deal at 415 fr. (\$19.80), or thereabouts, on truck Modane. The entente of producers of hematite is virtually settled.

Semi-Finished Products.—The current of inland business is good under terms of the entente. Export rates have hardened somewhat; some Belgian billets have been dealt at £5 15s. (\$27.83) delivered British port. Nevertheless, blooms are still being dealt at £4 10s. (\$21.78) f.o.b. Antwerp; billets at £4 12s. 6d. (\$22.39) and targets at £4 16s. (\$23.23).

Rolled Steels.—A rather good current of business has been noted in heavy beams and steel for reinforced concrete, which would tend to show a slight revival of activity in the building industry. Prices of the entente are generally well maintained, in spite of the prevailing calm in merchant steels. For export, beams are quoted £5 3s. (1.11c. per lb.) f.o.b. Antwerp, while bars are at £5 6s. (1.15c.).

Sheets.—Calm prevails in heavy and medium sheets and in consequence there are infringements on conditions fixed by the O. S. P. M. For October a rise in prices is expected if, by then, the price of coke has risen. With regard to light sheets the prices of independent rolling mills are mostly below those imposed by the O. S. P. M.

Rolled Steel Entente Considered

WASHINGTON, Sept. 21.—An entente for rolled steel products among French manufacturers has not yet been definitely decided upon, because of difficulties occasioned by the diversity of these products and by the various locations of the plants, says a cablegram received by the Department of Commerce from Paris. It is stated that there is little doubt that an entente will be established for beams, which presents a more simple question.

French production of pig iron in August amounted to 724,164 tons, practically the same as in July. Exportation was maintained on a large scale.

The relatively small share which American iron and steel manufacturers enjoy in the trade of the territory in East Africa known as the Colony and Protectorate of Kenya, controlled by Great Britain, leads the Iron and Steel Division, Department of Commerce, to the belief that they should find an increasing market there. By reason of this belief the division has prepared a special circular from numerous reports by Consul Avra M. Warren, Nairobi, Colony of Kenya, giving a résumé of the trade and market conditions in a diversified line of commodities.

STRUCTURAL STEEL

Sales to Date Over 10 Per Cent Better Than Same Period Last Year

WASHINGTON, Sept. 22.—Sales of fabricated structural steel in August were 79 per cent of capacity, based on total bookings of 193,647 tons reported by 169 firms with a capacity of 247,430 tons, according to the Bureau of Census. This compares with July bookings of 83 per cent, based on reports of 183 firms with a capacity of 249,830 tons whose sales were 237,573 tons. Computed tonnage booked in August amounted to 229,100 tons while for the first eight months of the current year it totaled 1,679,100 tons as against 1,516,700 tons for the corresponding period of last year.

Shipments in August amounted to 83 per cent of capacity as against 85 per cent in July. Computed shipments in August aggregated 240,700 tons and for the eight months ending with August amounted to 1,734,200 tons, compared with 1,571,800 tons for the corresponding period of 1924.

Structural Awards Nearly 34,000 Tons

Structural steel awards within the week, as reported to THE IRON AGE, totaled close to 34,000 tons, including 8000 tons for the Hotel Statler, Boston, 3000 tons for a power plant in Detroit, 2300 tons for a loft building and 2100 tons for an apartment building in New York. Other awards were mostly small. In a total of 15,000 tons of jobs pending, the largest is 3850 tons for a power plant at Waukegan, Ill. Awards include the following:

Hotel Statler, Boston, 8000 tons, to American Bridge Co.
Apartment building, West Seventy-second Street, New York, 2100 tons, to Taylor-Fichter Steel Construction Co.
Apartment building, Central Park West and Ninety-second Street, New York, 1000 tons, to Bethlehem Fabricators, Inc.
Public school No. 219, Brooklyn, 1250 tons, to Harris Structural Steel Co.
Theater, Avenue A, New York, 300 tons, to Post & McCord.
U. S. Metals & Refining Co., Carteret, N. J., plant addition, 200 tons, to Pittsburgh Bridge & Iron Works.
Central Railroad of New Jersey, bridge at Allentown, Pa., 700 tons, to Bethlehem Steel Corporation.
Pan-American Petroleum & Transport Co., seven oil tanks, 1500 tons, to Riter-Conley Co.
State of New Jersey, highway bridge at Camden, 200 tons, to McClintic-Marshall Co.
Apartment building, Fifth Avenue and Ninety-fourth Street, New York, 700 tons, to Harris Structural Steel Co.
Office building, White Plains, N. Y., 600 tons, to Hay Foundry & Iron Works.
Synagogue, Ninety-fifth Street, New York, 250 tons, to Harris Structural Steel Co.
Loft building, 268 West Thirty-ninth Street, New York, 2300 tons, to McClintic-Marshall Co.
Office building, Tremont Street and Daly Avenue, New York, 300 tons, to Hay Foundry & Iron Works.
E. L. Phillips & Co., 30 Church Street, New York, transmission towers for Campbell N. Y., 220 tons, to Lehigh Structural Steel Co.
High school, Pawtucket, R. I., 800 tons, to Providence Steel & Iron Co.
Central fire station, Boston, 440 tons, to Boston Bridge Works.
Boston & Albany Railroad, Springfield, Mass., canopy over passenger station, 420 tons, to Boston Bridge works.
Theater, Harvard Square, Cambridge, Mass., 175 tons, to A. L. Smith Iron Works, Boston.
Detroit Edison Co., Detroit, power house, 3000 tons, to Jones & Laughlin Steel Corporation.
Lake Erie Limestone Co., Youngstown, Ohio, crushing and loading plant at Hillsville, Pa., 350 tons, to Bollinger-Andrews Construction Co.
Big Four Railroad, bridges, 240 tons, to McClintic-Marshall Co., and 190 tons, to Bethlehem Steel Corporation.
Milwaukee Electric Railway & Light Co., garage, 240 tons, to Worden-Allen Co.
J. & W. A. Elliott Co., Minneapolis, Minn., guest lodge for Masonic Home, 100 tons, to American Bridge Co.
New York Central Lines, station at Youngstown, Ohio, 290 tons, to McClintic-Marshall Co.
Piccadilly Theater, Chicago, 500 tons, to Gage Structural Steel Co.

Wharfs and sheds, Poland Street, New Orleans, 1200 tons, to Rochester Bridge Co.

Elks' Club, East Chicago, Ill., 175 tons, to Beatty Machine & Mfg. Co.

Viaduct, Holton Street, Milwaukee, 200 tons, to Lakeside Bridge & Steel Co.

Marblehead Lime Co., South Chicago, 200 tons, kiln and hydrate building, to Worden-Allen Co.

Carbonization building for Lakeside power plant at Milwaukee, 150 tons, to Milwaukee Bridge Co.

Latham Square Corporation, Sixteenth Street and Telegraph Avenue, Oakland, Cal., office building, 1350 tons, to Judson Mfg. Co.

Phelps-Dodge Corporation, Douglas, Ariz., 950 tons, to McClintic-Marshall Co.

Southern California Edison Co. power plant, Long Beach, Cal., 600 tons additional, to Llewellyn Iron Works.

Carthay Center Theater, Los Angeles, 260 tons additional, to Llewellyn Iron Works.

Esquimalt, B. C., 150 tons sheet piling, to United States Steel Products Co.

Pennsylvania Railroad, bridge in Ohio, 440 tons, to American Bridge Co.

High school, Albany, N. Y., 1500 tons, to an unnamed fabricator.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

New York subways, section I, route 105, Fort Washington Avenue, Manhattan, 2400 tons; low bidder was Arthur McMullen Co.

City of New York, Manhattan bridge approach, 2000 tons, low bidder was McClintic-Marshall Co.

Junior high school, Quincy, Mass., 150 tons.

Apartment building, 390 Beacon Street, Boston, 1180 tons.

Cleveland Stone Co., mill building at Amherst, Ohio, 350 tons, bids taken.

Great Northern Railroad, bridges, 2600 tons.

University of Chicago, Chicago, field house, 875 tons.

Market Street bridge, Harrisburg, Pa., 300 tons.

Public Service Co. of Northern Illinois, addition to power house at Waukegan, 3850 tons.

Union Hotel addition, Salt Lake City, Utah, 1000 tons.

Neches, Tex., power house, 500 tons.

Potter Valley Road Water District, Portland, Ore., 300 tons.

Eugene Water Board, Eugene, Ore., 300 tons.

City of Sutherland, Ore., 300 tons.

Cascade Locks bridge over Columbia River, Wash., 1200 to 1500 tons, bids close about Oct. 1.

Theater, Telegraph Avenue, Oakland, Cal., 200 tons.

Bridge over Mormon Channel, Stockton, Cal., 186 tons.

Moore Dry Dock Co. low bidder.

U. S. Engineers' Office, St. Louis, 6 steel barges, about 140 tons each; Dravo Contracting Co., Pittsburgh, low bidder at \$95,220, delivered Pittsburgh.

RAILROAD EQUIPMENT

Chesapeake & Ohio Buys 50 Locomotives— Illinois Central Orders 1000 Cars

The outstanding equipment purchases of the week were 50 locomotives by the Chesapeake & Ohio and 1000 box cars by the Illinois Central. The Baltimore & Ohio and Western Fruit Express have placed orders for steel underframes.

News items of the week follow:

The Chesapeake & Ohio Railroad has ordered 50 locomotives from the American Locomotive Co. Its recent inquiry indicated that a total of 110 might be purchased.

The Montour Railroad has inquired for 500 steel coal cars of 55 tons capacity.

The Baltimore & Ohio has placed an order with the Standard Steel Car Co. for 1000 steel hopper car bodies.

The Merchants' Despatch Transportation Co. has received an order from the New York Central for 1000 refrigerator cars.

The Illinois Central has ordered 1000 box cars, 500 from the American Car & Foundry Co. and 500 from the Pullman Car & Mfg. Corporation.

The Western Fruit Express has ordered 287 steel underframes from the Pressed Steel Car Co.

Armour & Co., Chicago, are in the market for 300 steel underframes for beef cars.

The Illinois Traction Co. has purchased 50 hopper cars from the Mount Vernon Car Mfg. Co.

The Delaware, Lackawanna & Western has placed an order with the Pullman Car & Mfg. Co. for 15 passenger coaches.

Iron and Steel Markets

CONSUMPTION IS LARGE

Bars Show Greatest Gains in New Business

Variations in Sheet and Wire Prices—Pig Iron Market Strengthened

The steel trade as a whole is rather in the position of consolidating its gains of August and early September than of making a further forward movement in production. In new business, steel bars show the largest gain, some good contracts having been closed for the fourth quarter, and a number of mills came nearer to having backlogs in this widely used product than at any time since February.

Rail buying still figures largely in all predictions for the later fall and the present week has converted some recent car and locomotive inquiry into contracts. October and November are expected to bring out rail orders from leading lines, with the possible exception of the Pennsylvania, which only bought its 1925 rails last February and thus far has called for but a part of them.

Manufacturing consumers of steel as a rule are holding to their recent rate of operations, which was exceptional for the summer months. Car works have picked up but little and there is some falling off in automobile output, though less than was expected apart from the special interruption at the Ford plant.

Steel ingot production, taking the average of the industry, is probably a little above 75 per cent. The steel corporation apparently has reduced its pig iron stocks, as one Edgar Thomson furnace has blown in and one of the Carrie group will follow.

On the ordinary run of steel bar business the recent increase in buying has brought a firmer market. Detroit is still a soft spot and larger transactions elsewhere have been at 1.90c. The sheet market still shows weak spots and wire nails at \$2.60 represent a concession of \$1 a ton. Wire mill orders this month from jobbers and manufacturers exceed those of the first three weeks in August and operations are now over 60 per cent.

The effort of some steel manufacturers to secure a large operation, regardless of seasonal limitations and of the settled policy of consumers to limit stocks, points to a continuance of the present price situation.

Equipment purchases of the week include 50 locomotives for the Chesapeake & Ohio, 1000 box cars for the Illinois Central and 1000 steel underframes for the Baltimore & Ohio.

New structural awards amount to 34,000 tons. The largest of these was the Hotel Statler, Boston, 8000 tons. August sales of fabricated steel were 79 per cent of capacity, compared with 83 per cent in July. Shipments were 83 per cent in August and 85 per cent in July. For the eight months this year the shipments were 1,734,000 tons against 1,572,000 tons for that period in 1924.

The South Shore bridge at Montreal, 28,000 tons, goes to the Dominion Bridge Co., but the announcement of the steel award in this country is yet to be made. The Midland (Ontario) Shipbuilding Co. has taken a large freight boat, requiring 5000 tons of plates.

Production of sheets in August, according to records of the association of independent sheet-makers, was nearly 10 per cent and shipments were nearly 9 per cent above those in July. Unfilled orders were reduced barely 3 per cent, and on Aug. 31 represented six to seven weeks of the current rate of output, which is over 85 per cent of capacity. August sales were about 5 per cent below the July total.

The 50c. pig iron advances of last week at Pittsburgh and Chicago followed substantial bookings for the last quarter of the year. In some other districts, including the East, they have brought various large foundry interests into the market for round lots. Merchant pig iron production is about holding its own, and the same is true of foundry operations. Southern pig iron and Ohio silveries have advanced. The coke situation, apart from some nervousness over labor, is little changed, with prompt furnace coke at \$3.75.

The sale of 38,000 tons of receiver's pig iron in eastern Ohio means the gradual marketing of a stock locked up for months.

Steel scrap is lower in all markets and in the Chicago district shipments have been held up by steel companies. In the Pittsburgh district a number of steel makers have increased the pig iron percentage in their open hearth operations.

A German cast iron pipe foundry again made low prices on a portion of the 7000 tons on which bids were taken in New York this week. At the previous letting in July foreign bids were rejected.

Further advance in THE IRON AGE composite price for pig iron brings it to \$19.54, against \$19.46 last week. The gain since mid-year has been 58c. or 3 per cent.

Pittsburgh

Furnace Coke Up—Scrap Weaker but Pig Iron Firm

PITTSBURGH, Sept. 22.—The past week has been productive of no important changes in the iron and steel situation. Prices are unchanged, the rate of ingot production is holding to the recent 75 per cent gait and demand has no new characteristics, since buyers continue to have faith in the ability of the mills to produce and of the railroads to move their needs promptly, and they are making their purchases accordingly.

Some inclination to anticipate requirements is observed on the part of automobile builders in connection with sheets and the volume of steel bar business is such that practically all makers have relatively long schedules. In other directions backlogs are lacking. There still is much complaint that prices are too low, but it is observed that in those products about which this complaint is most frequently made, the explanation is to be found in the fact that manufacturers have not been able to adjust themselves to the close range buy-

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Sept. 22, 1925	Sept. 15, 1925	Aug. 25, 1925	Sept. 22, 1924
No. 2X, Philadelphia...	\$22.26	\$21.76	\$21.76	\$21.76
No. 2, Valley Furnace...	19.00	19.00	18.50	19.50
No. 2 Southern, Cin'tit...	23.05	23.05	22.55	21.55
No. 2, Birmingham, Ala. f...	18.50	18.50	18.00	17.50
No. 2 foundry, Ch'go furn.*	21.50	21.00	20.50	20.50
Basic, del'd, eastern Pa.	21.00	20.50	20.50	20.00
Basic, Valley furnace...	18.50	18.50	18.00	19.00
Valley Bessemer del'd. P'gh	21.26	21.26	20.76	21.76
Malleable, Chicago furn.*	21.50	21.00	20.50	20.50
Malleable, Valley	19.00	19.00	18.50	19.50
Gray forge, Pittsburgh...	20.26	20.26	19.76	20.76
L. S. charcoal, Chicago...	29.04	29.04	29.04	29.04
Ferromanganese, furnace...	115.00	115.00	115.00	95.00

Rails, Billets, etc., Per Gross Ton:	Sept. 22, 1925	Sept. 15, 1925	Aug. 25, 1925	Sept. 22, 1924
O.-h. rails, heavy, at mill.	\$43.00	\$43.00	\$43.00	\$43.00
Bess. billets, Pittsburgh...	35.00	35.00	35.00	36.00
O.-h. billets, Pittsburgh...	35.00	35.00	35.00	36.00
O.-h. sheet bars, P'gh...	35.00	35.00	35.00	37.00
Forging billets, base, P'gh	40.00	40.00	40.00	42.00
O.-h. billets, Phila...	40.30	40.30	40.30	41.17
Wire rods, Pittsburgh...	45.00	45.00	45.00	46.00
Skelp, gr. steel, P'gh, lb.	1.90	1.90	1.90	2.00
Light rails at mill...	1.65	1.65	1.60	1.85

Finished Iron and Steel,	Sept. 22, 1925	Sept. 15, 1925	Aug. 25, 1925	Sept. 22, 1924
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia...	2.12	2.12	2.12	2.32
Iron bars, Chicago...	1.90	1.90	1.90	2.15
Steel bars, Pittsburgh...	1.90	1.90	1.90	2.00
Steel bars, Chicago...	2.10	2.10	2.10	2.00
Steel bars, New York...	2.24	2.24	2.24	2.34
Tank plates, Pittsburgh...	1.80	1.80	1.80	1.80
Tank plates, Chicago...	2.10	2.10	2.10	2.00
Tank plates, New York...	2.09	2.09	2.14	1.94
Beams, Pittsburgh...	1.90	1.90	1.90	2.00
Beams, Chicago...	2.10	2.10	2.10	2.00
Beams, New York...	2.24	2.24	2.24	2.24
Steel hoops, Pittsburgh...	2.40	2.40	2.40	2.60

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Sheets, Nails and Wire	Sept. 22, 1925	Sept. 15, 1925	Aug. 25, 1925	Sept. 22, 1924
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh	3.15	3.15	3.15	3.50
Sheets, black, No. 28, Chi-				
cago dist. mill...	3.30	3.30	3.30	...
Sheets, galv., No. 28, P'gh	4.20	4.20	4.20	4.60
Sheets, galv., No. 28, Chi-				
cago dist. mill...	4.35	4.35	4.35	...
Sheets, blue, 9 & 10, P'gh	2.25	2.25	2.30	2.70
Sheets, blue, 9 & 10, Chi-				
cago dist. mill...	2.40	2.40	2.40	...
Wire nails, Pittsburgh...	2.65	2.65	2.65	2.75
Wire nails, Chicago dist.				
mill...	2.70	2.70	2.70	...
Plain wire, Pittsburgh...	2.50	2.50	2.50	2.50
Plain wire, Chicago dist.				
mill...	2.55	2.55	2.55	...
Barbed wire, galv., P'gh...	3.35	3.35	3.35	3.45
Barbed wire, galv., Chi-				
cago dist. mill...	3.40	3.40	3.40	...
Tin plate, 100 lb. box, P'gh	\$5.50	\$5.50	\$5.50	\$5.50

Old Material, Per Gross Ton:	Sept. 22, 1925	Sept. 15, 1925	Aug. 25, 1925	Sept. 22, 1924
Heavy steel scrap, P'gh...	\$18.50	\$19.00	\$19.00	\$18.50
Heavy steel scrap, Phila...	17.00	17.50	16.50	17.00
Heavy steel scrap, Ch'go...	16.00	16.25	16.75	16.50
No. 1 cast, Pittsburgh...	17.50	17.50	17.50	18.00
No. 1 cast, Philadelphia...	18.00	18.00	18.00	18.00
No. 1 cast, Ch'go (net ton)	17.75	18.00	18.00	18.50
No. 1 RR. wrot, Phila...	18.00	17.50	17.50	19.00
No. 1 RR. wrot, Ch'go (net)	14.75	15.25	16.75	15.00

Coke, Connellsville,	Sept. 22, 1925	Sept. 15, 1925	Aug. 25, 1925	Sept. 22, 1924
Per Net Ton at Oven:				
Furnace coke, prompt...	\$3.75	\$3.40	\$3.25	\$3.00
Foundry coke, prompt...	4.25	4.25	4.00	4.00

Metals,	Sept. 22, 1925	Sept. 15, 1925	Aug. 25, 1925	Sept. 22, 1924
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York...	14.87 1/2	15.00	15.00	13.25
Electrolytic copper, refinery	14.50	14.62 1/2	14.62 1/2	12.75
Zinc, St. Louis...	7.85	7.75	7.65	6.12 1/2
Zinc, New York...	8.20	8.10	8.00	6.47 1/2
Lead, St. Louis...	9.25	9.25	9.50	7.85
Lead, New York...	9.55	9.60	9.70	8.10
Tin (Straits), New York...	58.50	58.50	57.75	46.37 1/2
Antimony (Asiatic), N. Y.	17.00	17.12 1/2	17.00	11.00

THE IRON AGE Composite Prices

Sept. 22, 1925, Finished Steel, 2.396c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets. These products constitute 88 per cent of the United States output of finished steel.	{ One week ago, 2.396c. One month ago, 2.396c. One year ago, 2.474c. 10-year pre-war average, 1.689c.
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Sept. 22, 1925, Pig Iron, \$19.54 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham.	{ One week ago, \$19.46 One month ago, 19.04 One year ago, 19.46 10-year pre-war average, 15.72
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High	Low	High	Low	High	Low
1923	1924	1925	1925	1924	1923
2.824c., April 24	2.789c., Jan. 15	2.560c., Jan. 6	2.396c., Aug. 18	2.460c., Oct. 14	2.446c., Jan. 2
\$30.86, March 20	\$22.88, Feb. 26	\$22.50, Jan. 13	Pig Iron \$18.96, July 7	\$19.21, Nov. 3	\$20.77, Nov. 20

ing, which has been the rule almost constantly for the past three years except for a few brief periods around the end of each year. Many manufacturers still crave full order books and mill schedules of some length and that, together with present productive capacity, accounts for the present prices.

The recent advance in pig iron prices is well maintained, this being partly due to the fact that the steel companies seem to be increasing the amount of pig iron in their open hearth furnace charges, and that development incidentally explains a weaker situation locally in scrap. Furnace coke prices have advanced rather sharply since a week ago on a sale of a round tonnage to a local steel company for October delivery. This business was placed at \$3.75 per net ton at oven,

and establishes that price, which had previously been done on sales of coke for other than pig iron making purposes. In a general way, present coke prices find their basis chiefly in the demands occasioned by the anthracite mine suspension. The wage situation in the Connellsville district is unchanged and there is an ample supply of labor. Blast furnace resumption is not looked for in the near future with coke and pig iron at present levels. Pig iron consumers are fairly well stocked and close observers do not look for a pig iron market that would be high enough to encourage the starting up of idle stacks and the consequent demand for coke. Connellsville operators are not eager to repeat the performance of last December when they advanced wages only to reduce them a few months

later. The Carnegie Steel Co. has started up another Edgar Thomson stack and will shortly blow in another Carrie furnace. These additions will give that company a total of 31 furnaces in operation out of a total of 56.

Pig Iron.—The advance of 50c. a ton announced a week ago is holding. This, rather than the amount of business being done, is the feature of the market. Melters generally are well covered against their requirements for the next few months and do not seem disturbed over the possibility that the coke situation may eventually lead to higher pig iron prices. The demand is coming from small users who do not buy very far ahead and their purchases are of about the same volume as they were before the recent advance in prices. The largest individual transaction reported in the week is one of 500 tons of foundry iron to a local sanitary ware manufacturer, who paid \$19, Valley furnace, for No. 2. Only small lots of other grades have been moved, but these have been at full quotations.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being \$1.76 per gross ton:

Basic	\$18.50
Bessemer	19.50
Gray forge	18.50
No. 2 foundry	19.00
No. 3 foundry	18.50
Malleable	19.00
Low phosphorus, copper free	\$27.75 to 28.00

Ferroalloys.—The market here is notable more for its firmness than activity. Only small tonnages of ferromanganese are moving and it seems to be the aim of consumers to maintain rather than add to their stocks. But efforts to secure lower prices than \$115, Atlantic seaboard, have been unavailing. Users of 50 per cent ferrosilicon do not appear to need any more tonnage than they are getting on their contract quotas and new business is almost nil. No new business of importance is reported in spiegeleisen. Prices are given on page 863.

Fluorspar.—A stronger tendency recently noted in prices of domestic fluorspar appears to have extended to foreign material, which now is priced at \$16 per net ton, c.i.f. Atlantic seaboard, duty paid. Freight to the Pittsburgh district is \$3.90, against \$5.25 from Illinois and Kentucky mines, giving the foreign material a delivered price advantage of \$1.35 per ton.

Semi-Finished Steel.—There is still a lack of open market activity in billets, slabs and sheet bars and quotations are merely nominal, since they are untested. Non-integrated manufacturers in the second and third quarters of the year have been drawing supplies from regular sources without the formality of new contracts covering these periods and there is not much information as to the detail of prices. There has been no inclination on the part of these mills to seek tonnages from other than regular sources of supply, nor are demands for finished products of a size to compel supplementary purchases. There are reports that \$33.50 has been the ruling settlement price between makers and their regular customers, with \$35 the price for occasional buyers, but this is not consistent with the assertion of strip makers that they have not been able to get a better price than \$35, Pittsburgh, on billets and slabs. There is just a fair demand for rods, with \$45, Pittsburgh or Cleveland, the ruling price on ordinary tonnages. Prices are given on page 863.

Steel and Iron Bars.—Mills in this district are well supplied with steel bar business and are steadily taking a stronger stand on prices, and now it takes an exceptionally attractive order to bring out a quotation of less than 2c. base, Pittsburgh. Most of the business runs to what are classified as ordinary tonnages for early delivery and on that kind of business 2c. is the ruling price. Iron bars are steady but not especially active. Prices are given on page 862.

Structural Material.—Efforts to establish a minimum of 2c. base, Pittsburgh, for large structural shapes have not yet been successful. For very small tonnages, 2c. is possible, but on most of the current business 1.90c. is the prevailing figure. Structural shops in this district are fairly busy, but all have ca-

capacity for additional business and competition in fabricated steel still is sharp enough so that fabricators cannot profitably pay more for their plain material. Prices are given on page 862.

Plates.—While there is a fair demand for miscellaneous tonnages, it is no strain upon capacity and competition for business keeps prices in the buyers' favor. The quotable range locally still is 1.80c. to 1.90c., base, Pittsburgh, but business outside the district is not netting mills even the lower quotation. Prices are given on page 862.

Bolts, Nuts and Rivets.—Bolt and nut makers are getting a fair number of contracts for fourth quarter, and current demands, although for early delivery, are providing a fairly good engagement of productive capacity. Rivet makers are talking of higher prices on the ground that present prices are not returning a new dollar for an old one. Prices and discounts are given on page 863.

Wire Products.—Testimony is not uniform this week as to business, some finding that orders bulked slightly smaller in the past week than in the week before, while others have noted a further gain. It is probably a fair appraisal that business is holding its own, with no tendency yet observed on the part of either jobbers or manufacturing consumers to buy beyond their known requirements. There is some disappointment among manufacturers that they are not booked farther ahead, seeing that there was no real buying during the spring and early summer months and that the heavy purchases of late last year must have largely gone into consumption. The answer probably is to be found in the fact that with the productive capacity that now exists and with the prompt railroad service now provided, buyers feel perfectly safe in continuing with a minimum inventory. There is no sign of an immediate advance in prices and that also is discouraging to stock building. Prices are steady. They are given on page 862.

Steel Rails and Track Supplies.—Operations of the local Steel Corporation rail making plant are increasing, two blast furnaces recently having gone on there, but there is not much public evidence in the shape of rail business to warrant this development. No activity worthy of note is observed in track accessories. The Northern Pacific Railroad is in the market for 2500 tons of spikes and 9000 kegs of track bolts, but this business probably will go to Western mills. Inquiry for light rails still is improving and higher prices are more confidently asked. Prices are given on page 862.

Tubular Goods.—There has been no material change in pipe mill operations in this and nearby districts. Not quite the rush for oil well goods is to be noted as a short time ago, but there is still enough demand, supplemented by a good business in standard pipe and the completion of line pipe orders still on makers' books, to keep productive capacity about 80 per cent engaged. A report from California states that 450 wells have been closed in there in an effort to correct an unfavorable supply situation, but in that field production is controlled by four or five big companies and a move of that sort is more easily made than in other districts where ownership of the wells is less concentrated. Mechanical tubing is moving well. Boiler tubes still leave much to be desired, both as to sales and prices. Discounts are given on page 862.

Sheets.—There is a good business in sheets, but seemingly the demand is not yet strong enough to sustain higher prices than lately have ruled. Without doubt consumption is heavy, but there is so much productive capacity and so many individual manufacturers that buyers still have a good deal to say as to prices. The market is slightly stronger on blue annealed sheets, but on galvanized sheets, on which higher prices appear more pressingly necessary on account of the high cost of zinc, makers still find it hard to get more than 4.20c. base, Pittsburgh. On black sheets 3.15c., the ruling price on ordinary sales, is not so low as some mills will go to get a desirable tonnage. Consumers, with the exception possibly of the automobile body builders, do not show much inclination to aban-

don a policy that calls for purchases in keeping with real requirements. In spite of that fact, however, last week was the largest in point of orders and specifications the American Sheet & Tin Plate Co. has had since the first week of last February. Independent companies are making an equally good showing. Low prices form the principal complaint of manufacturers. Prices are given on page 862.

Tin Plate.—The American Sheet & Tin Plate Co. late last week took an order for 100,000 boxes from a large can company which had underestimated its requirements for some styles of containers and now has to have tonnage in a hurry. This added to existing business, assures that company of sustained operations at about 80 per cent of capacity well through to November, when specifications should develop against early 1926 shipments to the Pacific Coast and Hawaii. Some of the independent companies are less fully engaged than recently, but as compared with other years at this season, they are reasonably busy. There is nothing new as to prices.

Cold-Finished Steel Bars and Shafting.—There is no complaint as to the volume of business, but the fact that there are price deviations and that they are coming with a little more frequency would indicate that makers need more business than they are getting. On ordinary tonnages, the price still ruling is 2.50c., base, Pittsburgh, but on attractive business \$1 to \$2 a ton less has been done.

Hot-Rolled Flats.—Demand holds up well and prices are firm at the levels which became common early in the summer. Prices are given on page 862.

Cold-Rolled Strips.—The automobile industry is a steady buyer and this accounts largely for the fact that makers in this district are reporting a sustained business. There is some complaint of lack of profit in the present price, but also satisfaction that the advance established early in the summer is holding.

Old Material.—The continued lack of consumer buying is telling on the market for steel works grades. Recent reconsigning of scrap from a Youngstown district mill meant overshipments against existing contracts elsewhere, taking such mills out of the market. In addition, most steel companies operating at the present gait of 70 to 75 per cent of capacity produce a high percentage of their scrap requirements, and lately there has been an increasing tendency to raise the proportion of pig iron in the charge. There is not much pressure against scrap prices, but dealers are anxious for business and have modified their ideas about 50c. a ton. There is no occasion to change materially the prices of grades outside of those used in open-hearth furnaces.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

Per Gross Ton	
Heavy melting steel.....	\$18.50 to \$19.00
No. 1 cast, cupola size.....	17.50 to 18.00
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	20.50 to 21.00
Compressed sheet steel.....	17.50
Bundled sheets, sides and ends...	16.50
Railroad knuckles and couplers...	21.00 to 21.50
Railroad coil and leaf springs...	21.00 to 21.50
Low phosphorus blooms and billet ends	23.00 to 23.50
Low phosphorus plate and other material	21.50 to 22.00
Railroad malleable	19.00 to 19.50
Steel car axles.....	21.00 to 21.50
Cast iron wheels.....	17.50 to 18.00
Rolled steel wheels.....	21.00 to 21.50
Machine shop turnings.....	15.00
Short shoveling turnings.....	15.00
Sheet bar crops.....	20.00 to 20.50
Heavy steel axle turnings.....	17.00 to 17.50
Short mixed borings and turnings	16.00 to 16.50
Heavy breakable cast.....	14.00 to 14.50
Stove plate.....	14.00 to 14.50
Cast iron borings.....	15.00
No. 1 railroad wrought.....	15.50 to 16.00
No. 2 railroad wrought.....	19.00

Coke and Coal.—The local steel company which recently inquired for 20,000 tons of furnace coke a month for last quarter shipment has closed for its October requirements at \$3.75 per net ton at ovens. This, however, represents a maximum price, since it is understood that in the event that wages in the Con-

nellsville district are advanced, shipments against the order will be stopped. At \$3.75 plus the advance occasioned by a wage increase, the coke would cost between \$4.40 and \$4.50, and the buying company has coking facilities of its own and producing costs well under that figure. The sale, however, establishes the furnace coke market at that level. There is no change in foundry coke, as the principal demand occasioned by the suspension of the anthracite mines has been in 48-hr. coke. The coal market is fairly active, but prices are steady, rather than strong, as supplies are ample. Prices are given on page 863.

Labor Situation in Connellsville Region

PITTSBURGH, Sept. 22.—The resumption of operations recently by the Pittsburgh Coal Co. at its Banning mines, near the boundary of Westmoreland and Fayette counties, has attracted a large number of mine union organizers to that district. In the past week they succeeded in getting the men employed at the plant of the Washington Coal & Coke Co. and Jamison mine of the Bethlehem Steel Co. to walk out, but evidently the men have thought better of the matter and in the past few days numbers of them went back to work.

The labor situation in the general Connellsville district occasions some nervousness among mine and oven operators, but it seems to be based on fears of what the union leaders may do, rather than on any definite signs of unrest among the workmen. While the demand for coal and coke is greater now than it was a few weeks ago, it has not yet brought into operation enough capacity to strain seriously the supply of labor, and there has been no change in the wage situation, except that some companies which during the slack summer period were paying 10 per cent less than the generally recognized independent scale, or \$4.50 per day for day labor, have gone back to \$5 a day.

Youngstown District Steel Output at 80 Per Cent

YOUNGSTOWN, Sept. 22.—Iron and steel production schedules for the current week in the Mahoning and Schenango valleys have increased, with steel ingot output averaging 80 per cent. The Carnegie Steel Co. will maintain ingot output this week at 86 per cent, as compared with 76 per cent for the week preceding. The Youngstown Sheet & Tube Co. has advanced production to an average rate of 75 per cent.

Of 127 sheet and jobbing mills in the Mahoning Valley, 111 are scheduled. The Carnegie company is operating bar mills at a capacity rate, while the Republic Iron & Steel Co. has six bar mills under power, including its 14-16-in. unit.

On Oct. 5 the A. M. Byers Co. will increase the number of active puddle mills at its Girard works from 45 to 88, its full complement. The Sharon Steel Hoop Co. has added one open hearth furnace, making a total of six active. The Trumbull Steel Co. is operating sheet and tinplate departments in full, but there has been some curtailment in active strip capacity. The Republic company and the Newton Steel Co. continue to operate 16 sheet mills each. Principal fabricating interests are maintaining schedules close to a normal rate.

The seventh annual meeting of the Army Ordnance Association will be held at the Aberdeen Proving Ground, Maryland, Oct. 2. The Franklin Institute, the National Aeronautic Association and the National Machine Tool Builders' Association will participate.

A progressive decline in motor car production from now on is indicated by the current volume of business of equipment companies, according to *Automotive Industries*. There is no indication of very considerable month to month changes in trucks and buses.

Chicago

Pig Iron Again Advances 50c.—Scrap Weak as Shipments Are Held Up

CHICAGO, Sept. 22.—Pig iron has again shown strength and prices have advanced on a number of grades. Sales thus far in September have held up well and merchant furnaces are comfortably booked for the remainder of the year. Fourth quarter buying is practically completed and there is some interest in first quarter requirements. In contrast with pig iron, scrap has manifested further weakness, which has been accentuated by the fact that large consumers not only have withdrawn from the market but in some instances are holding up shipments.

Current inquiries for the heavier products, such as plates, shapes and bars, are in good volume. In fact, they were heavier than usual during the week and have been exceeded only twice this year. Billets have increased slightly in demand and are a shade firmer. Railroad buying remains at a low ebb and although a number of car contracts were placed during the week, they were in general small. In this district the outstanding equipment order was that of the Illinois Central for 1000 box cars. Rail bookings were unusually light, but at the same time inquiries for track fastenings were received in good number. Demand for wire products has gradually extended and now reaches well into the North and Northwest and mills, operating at a slightly increased rate, find their stocks still further reduced. Building activity is still swinging along at a good gait for this time of the year. It is noticeable that although there are still a good number of small projects pending, the proportion of large tonnage inquiries has materially increased.

Mill operations remain the same, with the leading interest at about 75 per cent of ingot capacity, and the foremost independent at 80 per cent. The blowing in last week of the second stack at the Indiana Harbor plant of the Youngstown Sheet & Tube Co. increased the number of active steel stacks to 23, out of a total of 35 in the district.

Ferroalloys.—The market for ferromanganese has been very quiet, but spiegeleisen is slightly more active than for some time. Prices remain unchanged.

We quote 80 per cent ferromanganese, \$122.56, delivered; 50 per cent ferrosilicon for 1925 delivery, \$85, delivered; spiegeleisen, 18 to 22 per cent, \$39.76 to \$40.04, delivered.

Pig Iron.—Northern foundry, malleable and high phosphorus have again advanced 50c. a ton and are now quoted at \$21.50, base, local furnace, while the market on Northern No. 1 foundry is \$22, furnace. Buying is proceeding at an unchanged rate, in spite of the increase in price, and it is now believed that fourth quarter requirements are practically covered. A part of the buying during the past week consisted of repeat orders for delivery over the remainder of the year, and a small part of it was for first quarter shipment. The general impression throughout the trade is that the pig iron market is on a stable basis. Furnaces are well booked for the remainder of the year; furnace stocks have been still further reduced, and deliveries are being made as scheduled. The leading producer has at present the heaviest backlog in several years. An agricultural implement maker bought 4000 tons of malleable and foundry iron for first quarter requirements just before the present advance in price was made. A number of inquiries have come out for spot iron in lots ranging from 50 to 100 tons. Charcoal iron remains firm at \$29.04, delivered, Chicago. This commodity is more active, and a few lots of several hundred tons each were purchased for outlying districts. Southern iron is stronger and is now quoted at \$18.50 to \$19, base, Birmingham, or \$24.51 to \$25.01, delivered, Chicago, for all rail shipment. The barge rate is \$4.18. Low phosphorus has also become stronger and is quoted at \$31.10 to \$31.60, delivered, Chicago. Silvery, influenced by a more active market, has advanced to \$27, furnace, or

\$31.79, delivered, Chicago, for 8 per cent. Fourteen to 16 per cent ferrosilicon now ranges from \$45.25 to \$45.75, delivered, Chicago. Several sales of Jackson County silvery, ranging from 100 to 400 tons, have been closed at the new schedule.

Quotations on Northern foundry, high phosphorus, malleable and basic iron are f.o.b. local furnace, and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards:

Northern No. 2 foundry, sil. 1.75 to 2.25	\$21.50
Northern No. 1 foundry, sil. 2.25 to 2.75	22.00
Malleable, not over 2.25 sil.	21.50
High phosphorus	21.50
Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	29.04
Southern No. 2 (all rail)	\$24.51 to 25.01
Southern No. 2 (barge and rail)	22.68 to 23.18
Low phos., sil. 1 to 2 per cent, copper free	31.10 to 31.60
Silvery, sil. 8 per cent.	31.79
Ferrosilicon, 14 to 16 per cent.	45.25 to 45.75

Plates.—The Illinois Central has ordered 500 box cars each from the Pullman Car & Mfg. Corporation and the American Car & Foundry Co. The steel required will be approximately 10,000 tons. An additional 3000 tons of plates, shapes and bars is involved in 50 gondola cars purchased by the Hershey Cuban Railway, 15 coaches contracted for by the Delaware, Lackawanna & Western, 300 underframes ordered by the Fruit Growers Express and 50 gondola cars recently bought by the Kansas City, Mexico & Orient. Inquiries are out for 2600 tons of steel for two gas holders to be erected in the East. The United States Engineer's office, St. Louis, will require 1000 tons of shapes and plates for barge construction and the city of Detroit will need 2600 tons of plate for a pipe line. An inquiry is pending for 1500 tons of tank steel for an oil storage tank at San Pedro, Cal., and an additional 500 tons will be needed for tanks in Texas. Plate bookings have been in fair volume and practically balance production. Mill prices have shown no noticeable tendency to change.

The mill quotation is 2.10c., Chicago. Jobbers quote 3.10c. for plates out of stock.

Bars.—Both in demand and price steel bars remain steady and deliveries from mills range from four to five weeks. Bar iron demand has shown no improvement during the week and no change is looked for until railroad buying is resumed. Prices are fairly steady at 1.90c. to 2c., Chicago. Rail steel bar prices remain at 2c., Chicago, and mills show no tendency to slacken their rate of production, being booked ahead from four to five weeks on active specifications.

Mill prices are: Mild steel bars, 2.10c.; common bar iron, 1.90c. to 2c., Chicago; rail steel, 2c., Chicago, and 2c., mill.

Jobbers quote 3c. for steel bars out of warehouse. The warehouse quotations on cold-rolled steel bars and shafting are 3.60c. for rounds and hexagons and 4.10c. for flats and squares; 4.15c. for hoops and 3.65c. for bands.

Jobbers quote hard and medium deformed steel bars at 2.60c.

Wire Products.—Contracting by jobbers has now extended well into the North and Northwest and tonnage booked from all sections for the first three weeks of September is in excess of that for the corresponding period in August. The increase in demand is fairly uniform for all products. In many instances prompt shipment is insisted upon, thus indicating that stocks in the hands of jobbers are still low. Buying by the manufacturing trade is well diversified and is gradually becoming more active. With stocks slightly decreased the mills have speeded up a little and are now operating at between 60 and 65 per cent. Mill prices, which remain steady, are shown on page 862.

We quote warehouse prices f.o.b. Chicago: No. 8 black annealed wire, \$3.05 per 100 lb.; common wire nails, \$3.15 per keg; cement coated nails, \$2.15 to \$2.20.

Sheets.—Inquiry during the week has shown slight improvement, but local prices, while steady, are unchanged and will probably remain so until a more stable situation obtains in the markets east of Chicago. Specifications are fairly liberal and mill operations

have increased slightly as a result of more favorable weather.

Chicago delivered prices from mill 3.35c. to 3.40c. for No. 28 black, 2.45c. to 2.50c. for No. 10 blue annealed and 4.40c. to 4.45c. for No. 28 galvanized. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Jobbers quote f.o.b. Chicago: 3.50c. base for blue annealed, 4c. base for black, and 5c. base for galvanized.

Rails and Track Supplies.—No outstanding rail tonnages were booked in this district during the week, but it is anticipated that the railroads will shortly enter the market for their 1926 requirements. Although no important contracts were placed during the week for track fastenings, inquiries reached a large total. The Illinois Central has purchased 1000 tons of iron tie plates from a local maker.

Structural Material.—Demand for plain material for building construction remains active. The number of small tonnages on inquiry is unusual for this time of the year and, at the same time, several large projects are before the trade. A contract for wharves and sheds, Poland Street, New Orleans, 1200 tons, has been awarded to the Rochester Bridge Co. The Minneapolis Steel & Machinery Co. will fabricate 1000 tons for a California cement mill. The Great Northern bridge program for 1926 calls for 2600 tons. An addition to the Waukegan power house of the Public Service Co. of Northern Illinois will require 3850 tons rather than 1500 tons as first reported. One thousand tons of structural shapes and plates will be required for an addition to the Union Hotel, Salt Lake City, Utah.

The mill quotation on plain material is 2.10c., Chicago. Jobbers quote 3.10c. for plain material out of warehouse.

Bolts, Nuts and Rivets.—Specifications for bolts and nuts are coming in at an unchanged rate, warranting an output of from 65 to 70 per cent. Contracting for fourth quarter is well under way and prices remain unchanged. For mill prices see page 863.

Jobbers quote structural rivets, 3.50c.; boiler rivets, 3.70c.; machine bolts up to $\frac{1}{2}$ x 4 in., 55 per cent off; larger sizes, 55 off; carriage bolts up to $\frac{1}{2}$ x 4 in., 50 off; larger sizes, 50 off; hot-pressed nuts, squares, tapped or blank, \$3.50 off; hot-pressed nuts, hexagons, tapped or blank, \$4 off; coach or lag screws, 60 per cent off.

Cast Iron Pipe.—A gradual easing up of heavy municipal buying is in evidence, but with a great number of small tonnage lettings foundries are operating well and their deliveries are still about 60 days. The National Cast Iron Pipe Co. was the successful bidder on 200 tons of 6-in. Class B, for Fond du Lac, Wis., with a tender of \$42, base Birmingham. South Pekin, Ill., is inquiring for 90 tons of 8-in., 130 tons of 6-in. and 85 tons of 4-in., all Class B. Alliance, Ohio, will receive tenders on 570 tons of Classes C and D pipe in sizes ranging from 4 to 24 in. Evansville, Ind., will take bids on 250 tons of 8-in. Class C and La Grange, Ill., is inquiring for 125 tons of 4 and 6-in. Class B.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., \$53.20 to \$54.20; 6-in. and over, \$49.20 to \$50.20; Class A and gas pipe, \$4 extra.

Reinforcing Bars.—Present indications lead the trade to believe that late season buying of reinforcing bars will be in good volume. Tonnage pending is heavy and many new projects are coming up for bids. Lettings of 100 tons and over were not numerous during the past week, but the total tonnage booked was heavy because of the relatively large number of small orders placed. Warehouse prices on billet steel reinforcing bars remain at 2.60c., Chicago. Lettings include:

Holton Street viaduct, Milwaukee, 100 tons to the American System of Reinforcing.

Lake Shore Athletic Club, Chicago, 250 tons to the Kalman Steel Co.

Y. M. C. A. building, South Chicago, 200 tons to Concrete Engineering Co.

Paige Motor Co., addition, Detroit, 300 tons to McRae Steel Co.

G. H. Hammond, killing building, Chicago, 173 tons to Jones & Laughlin Steel Co.

Public school, 100th and Leavitt Streets, Chicago, 150 tons of rail steel to Calumet Steel Co.

Pending work includes:

School building, Marquette, Mich., 125 tons.

Hendrey Hospital, Ridge Avenue, Evanston, Ill., 100 tons.

Commonwealth Edison Co., second section of switch house, Crawford Avenue, Chicago, 100 tons.

Hospital, Freeport, Ill., 100 tons. James R. and Edward Law, architects.

Central Warehouse Co. building, Peoria, Ill., 200 tons. B. L. Hulsebus, architect.

Pennsylvania Railroad office building, Philadelphia, 500 tons. General contract awarded to Erwin & Leighton, Philadelphia.

Piccadilly Theater, Chicago, 630 tons, general contract to John Lundstrum.

Abraham Lincoln School, Rockford, Ill., 100 tons. General contractor, Holmquist & Peterson.

Seven bridges over the Illinois Central tracks at Grant Park, Chicago, 450 tons; general contract to Avery Brundage.

Public school, Wellington and McVicar Streets, Chicago, 150 tons; Siebold & Numkirchen, low bidders on general contract.

Public school, Fifty-eighth and Springfield Streets, Chicago, 150 tons. Low bidder on general contract, Frank Burke & Son.

Old Material.—The past week has again shown a tendency toward weakness in the scrap market. Large consumers appear to have withdrawn completely from the market for the time being and in some instances have had shipments deferred. Small consumers are absorbing distress tonnage and in so doing are taking advantage of the weakness of prices. One user bought 1000 tons of miscellaneous rails at \$18 per gross ton and a local mill took 1000 tons of melting steel at \$16.25 per gross ton, delivered. Railroad lists have been exceedingly light.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	\$19.00 to \$19.50
Cast iron car wheels	17.50 to 18.00
Relaying rails, 56 lb. to 60 lb.	25.00 to 26.00
Relaying rails, 65 lb. and heavier	26.00 to 31.00
Forged steel car wheels	19.00 to 19.50
Railroad tires, charging box size	19.25 to 19.75
Railroad leaf springs, cut apart	19.25 to 19.75
Rolls for rolling	19.00 to 19.50
Steel rails, less than 3 ft.	20.00 to 20.50
Heavy melting steel	16.00 to 16.25
Frogs, switches and guards, cut apart	17.75 to 18.25
Shoveling steel	16.00 to 16.25
Drop forge flashings	12.00 to 12.50
Hydraulic compressed sheets	13.75 to 14.25
Axle turnings	14.00 to 14.50
Steel angle bars	20.50 to 21.00
Steel knuckles and couplers	19.60 to 19.50
Coil springs	19.75 to 20.25
Low phosph. punchings	18.50 to 19.00
Machine shop turnings	10.00 to 10.50
Cast borings	13.00 to 13.50
Short shoveling turnings	13.00 to 13.50
Railroad malleable	19.00 to 19.50
Agricultural malleable	18.00 to 18.50

Per Net Ton	
Iron angle and splice bars	18.50 to 19.00
Iron arch bars and transoms	21.00 to 21.50
Iron car axles	27.00 to 27.50
Steel car axles	17.50 to 18.00
No. 1 busheling	12.75 to 13.25
No. 2 busheling	9.00 to 9.50
Pipes and flues	11.50 to 12.00
No. 1 railroad wrought	14.75 to 15.25
No. 2 railroad wrought	14.50 to 14.75
No. 1 machinery cast	17.75 to 18.25
No. 1 railroad cast	17.00 to 17.50
No. 1 agricultural cast	16.75 to 17.25
Locomotive tires, smooth	16.50 to 17.00
Stove plate	14.75 to 15.25
Grate bars	14.75 to 15.25
Brake shoes	14.75 to 15.25

Rehabilitating Trumbull Steel Affairs

YOUNGSTOWN, Sept. 22.—In the rehabilitation program of the Trumbull Steel Co., Warren, drastic economies are being effected under direction of the committee in charge of management, headed by James A. Campbell, president Youngstown Sheet & Tube Co. The working force is being reorganized. Some 300 men employed in the operating department have been released.

Directors were scheduled to meet Wednesday of this week at the principal offices in Warren to receive report of accountants who have been going over the company's books. The inclusion of the Trumbull company in a midwest independent steel merger is still dormant and the proposal has not been wholly abandoned.

Meanwhile, the company's plants at Warren and Leavittsburg continue to operate at a rate close to normal, though some reduction in active tin plate capacity is to be expected at an early date, because of seasonal decline in demand.

New York

Larger Movement in Pig Iron—German Pipe Foundry Again Low Bidder

NEW YORK, Sept. 22.—The pig iron market has been considerably more active in the past week, chiefly because of purchases by larger foundry interests, in part for plants in the metropolitan district but much more for foundries in other parts of the country. The American Locomotive Co. is understood to have bought all of the 4250 tons it had under inquiry for its Dunkirk, Schenectady and Richmond foundries. Buffalo furnaces had a good deal of this business. The Richmond part went to Virginia and Alabama. The Central Foundry Co. made purchases estimated at 5000 tons, for shipment to two or three plants for the rest of this year. In New England the greater part of 7500 tons was bought by a textile machinery manufacturer. In this connection some Buffalo iron went at \$18.25 and a moderate tonnage of German iron is reported to have been taken. A large inquiry from an interest in the metropolitan district calls for shipment in the remainder of this year and through a portion of the first quarter. The greater part of this iron has been bought, the total being put at close to 7500 tons. One foundry is in the market for 1300 tons for shipment in the next six months. Considerable negotiating has gone on in the past few days and a number of transactions have been put through without a general submission of bids. Continental iron has been selling in lots of several hundred tons at a range of \$21 to \$21.50 for the equivalent of No. 1X, duty paid. The advances in pig iron markets farther West have made their impression on the Eastern situation, but some larger buyers have found prices not far different from those of the summer months.

We quote delivered in the New York district as follows, having added to furnace prices \$2.52 freight from eastern Pennsylvania, \$4.91 from Buffalo and \$5.44 from Virginia:

East. Pa. No. 2, sil. 1.75 to 2.25	\$23.02 to \$23.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	23.52 to 24.02
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	24.02 to 24.52
Buffalo, sil. 1.75 to 2.25	23.41 to 23.91
No. 2 Virginia, sil. 1.75 to 2.25	28.44 to 28.94

Ferroalloys.—Sales of ferromanganese of at least 500 tons are noted, including one lot of 300 tons. As a whole the market is quieter than in some time, there being no new inquiries reported.

Finished Iron and Steel.—The volume of steel business in the three weeks of September is quite satisfactory, representing a gain in tonnage over August of 10 to 25 per cent, depending on the products and the mills. These figures, of course, relate to the orders obtained in the New York district, but reports which sales agents get from their home offices indicate that the gain is general and on some products deliveries are lengthening slightly. The improvement has not extended to prices, although mill representatives continue to make strong efforts to obtain the maximum quotations on fourth quarter business. On steel bars the larger buyers are still getting 1.90c., Pittsburgh, with the common run of orders at 2c. The larger producers of structural shapes get 1.90c., Pittsburgh, with some mills occasionally quoting 1.85c., Pittsburgh, or equivalent. Fabricated steel prices are \$2.50 to \$3 a ton higher than a month ago and further advances are predicted in the trade. Plates continue weak, with 1.75c., Pittsburgh, quite common on sizable orders, and 1.70c. is occasionally quoted. The 1.80c. quotation now applies mostly on less than carload business. Sheets have not greatly strengthened, notwithstanding efforts in that direction, and sales of blue annealed have been made at 2.20c., Pittsburgh, although 2.25c. and 2.30c. are the more frequent quotations. Galvanized sheets are obtainable at 4.20c., with some mills asking 4.30c., while black sheets, particularly the full finished varieties, are obtainable at 3.10c., Pittsburgh, with 3.15c. and 3.20c. continuing as the minimum of some mills. Occasional concessions on wire nails are heard of, 2.60c., Pittsburgh, having been named particularly at some New England points. The recent advance of \$4 a ton on fence posts appears to be general. Larger consumers

of cold finished steel bars and shafting have covered at 2.40c., Pittsburgh, although the usual quotation is 2.50c. Presumably the prevalence of these concessions is due to the desire of some mills to obtain a good backlog for fourth quarter. Consumers, in placing orders more freely, are reported to be less inclined to haggle over prices. The New York Central has sent out inquiries for its fourth quarter requirements, which are smaller than usual; they cover 1500 tons of plates, shapes and bars, about 350 tons of wire products and small tonnages of other forms of steel.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.24c. to 2.34c.; plates, 2.09c. to 2.19c.; structural shapes, 2.14c. to 2.24c.; bar iron, 2.14c. to 2.24c.

Warehouse Business.—Jobbers' books indicate that September's volume of business will exceed that of August, but will fall below July. Demand is still on the mend, though prices show weakness. Price cutting is the usual course in sheet transactions and little business is done at the higher quotations. Plates, shapes and bars also are subject to price concessions. See page 878 for prices. We quote boiler tube per 100 ft. as follows:

Lap welded steel tubes, 2-in., \$17.33; seamless steel, 2-in., \$20.24; charcoal iron, 2-in., \$25; 4-in., \$67.

Cast Iron Pipe.—Prices on bell and spigot pipe continue firm with apparently less tendency to shade, except when domestic makers are directly meeting the competition of the foreign product. On the tonnage of water pipe, fittings, valves and fire hydrants, totaling 7000 tons, opened by the Department of Purchase, New York, Sept. 16, the Gelsenkirchener Bergwerks A. G. was low on six of the 15 items. The Board of Estimate and Apportionment has been requested to render a decision on the question of awarding to the German company. Specifications are in preparation by New York for another purchase of about the same tonnage, bids to be advertised following award of the present tonnage. A gas company in New Jersey is reported to have closed on 1000 tons of 4-in. gas pipe at about \$50 per ton, believed to have been purchased from the French seller, the Pont-a-Mousson works. This same purchaser is expected to come into the market for about 5000 tons of gas pipe for spring delivery. Soil pipe continues weak and discounts unchanged.

We quote pressure pipe per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, \$50.60 to \$51.60; 4-in. and 5-in., \$55.60 and \$56.60; 3-in., \$65.60 to \$66.60, with \$5 additional for Class A and gas pipe. Discounts of both Northern and Southern makers of soil pipe, f.o.b. New York, are as follows: 6-in., 45 to 50 per cent off list; heavy, 55 to 60 per cent off list.

Old Material.—Prices on various grades are uneven, in some instances registering slight advances based on brokers' offering prices. No. 1 heavy melting steel is unchanged at \$16 to \$17 per ton, depending upon the delivery in eastern Pennsylvania, but borings and turnings are stronger with brokers offering \$13 per ton, delivered Bethlehem and as high as \$13.50 per ton, delivered Steelton, Pa. Pipe continues stronger, some brokers offering up to \$17 and slightly better per ton, delivered to an eastern Pennsylvania consumer. Machine shop turnings are unchanged at a buying price of \$13 to \$13.50 per ton, delivered.

Buying prices per gross ton New York follow:

Heavy melting steel, yard	\$12.00 to \$12.50
Heavy melting steel (railroad or equivalent)	13.25 to 13.50
Rails for rolling	14.25 to 14.75
Relaying rails, nominal	23.00 to 24.00
Steel car axles	21.50 to 22.00
Iron car axles	24.00 to 24.50
No. 1 railroad wrought	14.50 to 15.00
Forge fire	10.50 to 11.00
No. 1 yard wrought, long	13.50 to 14.00
Cast borings (steel mill)	9.50 to 10.00
Cast borings (chemical)	13.00 to 14.00
Machine shop turnings	10.00 to 10.50
Mixed borings and turnings	9.25 to 10.25
Iron and steel pipe (1 in. diam., not under 2 ft. long)	12.75 to 13.25
Stove plate	11.00 to 12.00
Locomotive grate bars	11.00 to 11.50
Malleable cast (railroad)	15.00 to 15.50
Cast iron car wheels	14.00 to 14.50
No. 1 heavy breakable cast	13.00 to 14.00

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast	\$18.00 to \$18.50
No. 1 heavy cast (columns, building material, etc.), cupola size	16.50 to 17.00
No. 2 cast (radiators, cast boilers, etc.)	15.50 to 16.00

San Francisco

Apprehension of Mokelumne Litigation Increases—Market Is Quiet

SAN FRANCISCO, Sept. 19 (*By Air Mail*).—Indications point to the possibility of obstructive litigation in connection with the East Bay Municipal Utility District's Mokelumne River project. Nothing was done during the week toward awarding contracts, nor toward the disposal of the required \$39,000,000 bond issue. Opponents of the project have until Sept. 24, to ask for a rehearing by the State supreme court on the legality of the bonds. It is considered unlikely that the court will reverse itself by granting a rehearing, but difficulties with owners of riparian rights below the proposed Lancha Plana reservoir, have developed, and hearings are now being held by the State Division of Water Rights. The East Bay Municipal Utility District's proposed undertaking is also alleged to conflict with an application filed with the Federal Power Commission by S. E. Kieffer, a property owner on the Lancha Plana site, and one of the principal bidders on the entire Mokelumne project. At the utility district office in Oakland, however, it is thought that contracts will be signed and work started early in October.

Business during the week was more or less dull in nearly all markets. Price fluctuations continue in pig iron but there are some evidences of a firmer price tendency in structural material. In reinforcing bars price weakness noted a week ago continues, particularly in out-of-stock quotations.

Pig Iron.—A local importer has received about 2000 tons of English foundry iron during the week, most of which has already been sold here and in the Los Angeles district. A fair sized shipment of Indian iron is understood to be en route for late October delivery. Indian iron is quoted at about \$24, but it is reported to be obtainable for less in round tonnages. Prices on all irons continue to fluctuate, although the market is relatively quiet. Buyers are not yet ready to place for first half, and as most of the principal factors have covered their requirements for the rest of this year, it is understood that recent small orders have not come up to expectations.

*Utah basic	\$27.00 to \$28.00
*Utah foundry, sil. 1.75 to 2.25	27.00 to 28.00
**English foundry	26.00
**Belgian foundry	24.50 to 25.00
**Dutch foundry	24.00
**Indian foundry	24.00
**German foundry	25.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Shapes.—Lettings reported during the week total 3160 tons. Fresh inquiries call for about 1400 tons. The largest award, 1350 tons, was taken by the Judson Mfg. Co. for an Oakland office building. An additional 600 tons was taken by the Llewellyn Iron Works for the Southern California Edison Co. power plant at Long Beach, 1200 tons having been awarded a week ago. Prices appear to be strengthening, although intimations continue that 2.30c. c.i.f. Coast ports, is possible on desirable tonnages. In the general market, however, 2.35c. is more common.

Plates.—Quotations continue at 2.25 to 2.30c., c.i.f. Coast ports, in a quiet market. Fresh inquiries are small. Sutherland, Ore., is expected to call for about 300 tons. Portland, Ore., will close bids Sept. 25, for 300 tons for tank work, and the Eugene Water Board, Eugene, Ore., closes bids next week on 300 tons. No large lettings are known to have been closed during the past week.

Bars.—Less than 2.90c. is now considered possible for round tonnages of reinforcing bars from jobbers' stocks in San Francisco. Small lots, cut to length, have been sold recently at about 3.35c., in a few isolated instances, although most of the local jobbers continue to quote, and in most cases are able to get 3.80c. on small orders that require cutting. Jobbers, however, are frank in admitting that the price situation is unstable. Eastern mill prices continue at about 2.30c.

c.i.f., and rumors of 2.25, are still heard. About 2.35 to 2.40c. is being named on soft steel merchant bars.

Local mills are asking 2.40c., in most cases on 100-ton lots, f.o.b. San Francisco. Among recent reinforcing bar lettings are the following:

Oregon Highway Commission, for Hunters' Creek Bridge and Umatilla Bridge, 100 tons, to Pacific Coast Steel Co.
California Highway Commission, 100 tons, to unnamed company.
McDermott Apartments, Seattle, Wash., 100 tons, to Pacific Coast Steel Co.

Rails and Track Supplies.—The Key System Transit Co., Oakland, Cal., has placed 200 kegs of track spikes with an unnamed mill. Demand seems to have fallen off.

Warehouse Business.—Activity was confined principally to routine business. Current orders are for the most part small. Prices are substantially unchanged.

Merchant bars, \$3.30 base, per 100 lb.; merchant bars, $\frac{1}{2}$ in. and under, rounds, squares and flats, \$3.80 base, per 100 lb.; soft steel bands, \$4.15 base, per 100 lb.; angles, $\frac{1}{4}$ in. and larger x $1\frac{1}{2}$ in. to $2\frac{1}{2}$ in., inc., \$3.30 base, per 100 lb.; channels and tees, $\frac{1}{4}$ in. to $2\frac{1}{2}$ in., inc., \$3.90 base, per 100 lb.; angles, beams and channels, 3 in. and larger, \$3.30 base, per 100 lb.; tees, 3 in. and larger, \$3.30 base, per 100 lb.; universal mill plates, $\frac{1}{4}$ in. and heavier, stock lengths, \$3.30 base, per 100 lb.; spring steel, $\frac{1}{4}$ in. and thicker, \$6.30 base, per 100 lb.; wire nails, \$3.50 base, per 100 lb.; cement coated nails, \$3 base, per 100 lb.; No. 10 blue annealed sheets, \$3.70 per 100 lb.; No. 28 galvanized sheets, \$5.75 per 100 lb.; No. 28 black sheets, \$4.65 per 100 lb.

Cast Iron Pipe.—A number of contractors' lettings were closed during the week in connection with five public jobs. Prices are unchanged, \$50 to \$51 base, San Francisco, being named on water shipments. Among the jobs recently closed are the following:

Compton, Cal., 4 and 6-in. B, 243 tons, contractor's letting through Fisher & McCall.
Los Angeles, Cal., 16-in. B, 371 tons, to United States Cast Iron Pipe & Foundry Co.
San Diego, Cal., 4 and 6-in. B, 100 tons, contractor's letting through H. H. Peterson.
La Grande, Ore., size unstated, 100 tons, contractor's letting through Hartenbower Brothers.
North Sacramento, Cal., 10-in. B, 188 tons, contractor's letting through Chamber & De Golyer.
Compton, Cal., 10-in. B, 170 tons, contractor's letting through Vido Kovacevich.

Ferroalloys.—Interest is confined to small lots of ferromanganese, which is quoted at \$117.50, duty paid, incoming dock. The Southern Pacific Co. has placed 25 tons with a local importer, and a number of similar orders have been closed recently, aggregating 150 to 200 tons. Swedish ferrosilicon is quiet at \$93 duty paid, incoming dock.

Coke.—About 4000 tons of English coke was received during the week by a local importer. Interest is confined to small tonnages, although the number of recent orders is reported to be somewhat larger. Prices are unchanged.

English beehive, \$15 to \$16 at incoming dock, and English by-product, \$12 to \$14; German by-product, \$11.50 to \$12.

Birmingham

Blast Furnace Backlogs Still Large—New Sheet and Coke Capacity

BIRMINGHAM, Sept. 22.—While sales of pig iron are smaller than for several weeks, the market is still in a satisfactory condition, with accumulated bookings large enough to warrant steady production and further reduction of stocks. Quotations are firm at \$19 to \$19.50 per ton, No. 2 foundry, with the latter price adhered to on fourth quarter deliveries. The larger melters of pig iron have covered their requirements, but the smaller consumers appear to be taking more business, which is increasing their prompt needs. These small lot sales are considerable in the aggregate and the indications are that the blast furnace production, slightly reduced by the blowing out of one stack, will have to be reinforced by drafts from surplus stocks. There are predictions of another advance of 50c. a ton within 30 days. Several of the steady melters of iron have orders in hand and in sight which will warrant active operation for a protracted period. Basic iron production in the South is still in excess of

foundry output. Merchant furnaces, however, look for an increased demand for foundry iron. The Sloss-Sheffield Steel & Iron Co. has five blast furnaces in operation and is reducing stocks on hand at the rate of more than 12,500 tons per month.

We quote per gross ton, f.o.b. Birmingham district furnaces, as follows:

No. 2 foundry, 1.75 to 2.25 sil...	\$19.00 to \$19.50
No. 1 foundry, 2.25 to 2.75 sil...	19.50 to 20.00
Basic	19.00
Charcoal, warm blast.....	30.00 to 32.00

Rolled Steel.—Every steel plant in operation in the South is well supplied with business. A billet mill is being built at Fairfield to provide for the smaller sizes required by shops of the immediate district. A large sheet mill has been practically completed by the Tennessee Coal, Iron & Railroad Co., but no announcement has been made as to when operations will be started. There appears to be need for all steel now being produced, with railroads placing many orders and fabricating plants operating full. Soft steel bars are quoted at 2.05c. to 2.15c., Birmingham.

Cast Iron Pipe.—Additional lettings are reported and all shops are operating at capacity on pressure pipe, with no surplus stock. Quotations are firm at \$41 to \$42, Birmingham, on 6-in. and larger. Shipment of pressure pipe, in main, is to the Northwest, West and Middle West, with some little tonnage going into the Southeast.

Coke.—Demand for coke has improved and prices are higher, \$4.75 to \$5 being asked for foundry coke, both bee-hive and by-products. Output continues under what it was a few weeks ago. With the exception of furnace companies, no coke is accumulated here. The Republic Iron & Steel Co. will complete a 57-oven coke plant in this district between Oct. 15 and 30.

Scrap.—Demand for old material is active but quotations, with few exceptions, remain the same as they have been for some time. Much scrap is moving. Blast furnaces are using some, and heavy melting steel is being used in quantity, although \$13 continues as the average price.

We quote per gross ton, f.o.b. Birmingham district yards, as follows:

Cast iron borings, chemical....	\$15.00 to \$16.00
Heavy melting steel.....	13.00 to 14.00
Railroad wrought	12.00 to 13.00
Steel axles	18.00 to 20.00
Iron axles	17.00 to 19.00
Steel rails	13.00 to 14.00
No. 1 cast.....	16.00 to 17.00
Tramcar wheels	16.00 to 17.00
Car wheels	15.00 to 16.00
Stove plate	13.00 to 14.00
Machine shop turnings.....	7.00 to 8.00
Cast iron borings.....	7.00 to 8.00
Rails for rolling.....	16.50 to 17.00

Buffalo

Scrap Weak but Resists Decline—Pig Iron Firmer with 7000 Tons on Inquiry

BUFFALO, Sept. 22.—Makers report better feeling in pig iron. Merchant furnaces are not so active in selling as steel works stacks, and are endeavoring to maintain \$19 base. Inquiry for the week totaled 5000 to 7000 tons. One Depew melter is in the market for 1000 tons of malleable. Prices on No. 2 plain range from \$18.50 to \$19. Merchant furnaces claim that in some instances they are able to get the silicon differential on the \$19 base. Operations continue as before.

We quote prices f.o.b. gross ton, Buffalo, as follows:

No. 2 plain, sil. 1.75 to 2.25....	\$18.50 to \$19.00
No. 2X foundry, sil. 2.25 to 2.75.	18.50 to 19.00
No. 1 foundry, sil. 2.75 to 3.25....	19.00 to 19.50
Malleable, sil. up to 2.25.....	18.50
Basic	18.50
Lake Superior charcoal.....	29.28

Finished Iron and Steel.—Sellers see a little stronger condition prevailing. High carbon wire rods are in slightly better demand. Bars for mill delivery are quoted at 2.265c., base Buffalo, but 2.165c. can still be done. Sheets are stronger and the production has been materially increased. Black sheets are 3.465c.; galvanized, 4.565c., and blue annealed, 2.665c., delivered Buf-

falo, respectively. These are the going prices, though lower figures have been named.

Warehouse prices are being quoted as follows: Steel bars, 3.25c.; steel shapes, 3.35c.; steel plates, 3.35c.; No. 10 blue annealed sheets, 3.80c.; No. 28 black sheets, 4.75c.; No. 28 galvanized, 5.45c.; cold rolled shapes, 4.40c.; cold rolled rounds, 3.95c.; wire nails, 4c.; black wire, 4.05c.

Old Material.—There is very little change in the situation since last week; if anything, there has been further weakening of sentiment. Prices, however, so far have resisted this feeling and there has been little actual drop here. Mills are not in the market and dealers' activities have simmered down to very minor purchasing. Outside markets have lost strength also.

We quote prices f.o.b. gross ton, Buffalo, as follows:

Heavy melting steel.....	\$18.00 to \$18.50
Low phosphorus	20.00 to 20.50
No. 1 railroad wrought.....	16.50 to 17.00
Car wheels	16.50 to 17.50
Machine shop turnings.....	12.00 to 12.50
Cast iron borings.....	12.00 to 12.50
No. 1 busheling.....	16.50 to 17.00
Stove plate	15.50
Grate bars	14.50 to 15.00
Hand bundled sheets.....	13.00 to 13.50
Hydraulic compressed	16.50 to 17.50
No. 1 machinery cast.....	16.50 to 17.00
Railroad malleable	19.50 to 20.00
No. 1 cast scrap.....	17.00 to 17.50
Iron axles	26.00 to 27.00
Steel axles	20.00 to 20.50

Boston

Active Pig Iron Buying for First Quarter—Statler Hotel Award

BOSTON, Sept. 22.—Pig iron buying is again active with sales during the week of more than 10,000 tons in Boston alone. There is little open inquiry, but brokers are soliciting business actively. Contracting is for fourth and first quarters, with first quarter sales outnumbering fourth quarter three to one. Buffalo district, western Pennsylvania and New York State furnaces are taking most current business. Prices are not as firm owing to the willingness of furnaces to eliminate differentials on No. 2X and No. 1X iron, and because a New York State furnace, contemplating blowing in, desires a backlog. A western Massachusetts foundry bought 7500 tons of domestic No. 2 plain iron at a price equivalent to about \$18 on cars, Buffalo. Sales of Buffalo No. 2X for fourth quarter were made at \$18.50 and \$19, however. First quarter iron sold generally at \$19 and \$19.50, but \$18.50 has been done within a few days. Western Pennsylvania No. 2X is \$18.50, furnace, and No. 1X, \$19. New York State iron is selling largely on a delivered basis slightly under Buffalo. Foreign, eastern Pennsylvania, Virginia and Alabama irons are inactive.

We quote delivered prices on the basis of the latest sales as follows, having added \$3.65 freight from eastern Pennsylvania, \$4.91 from Buffalo, \$5.92 from Virginia, and \$9.60 from Alabama:

East. Penn., sil. 1.75 to 2.25.....	\$24.65
East. Penn., sil. 2.25 to 2.75.....	25.15
Buffalo, sil. 1.75 to 2.25.....	23.41 to 23.91
Buffalo, sil. 2.25 to 2.75.....	23.41 to 24.41
Virginia, sil. 1.75 to 2.25.....	23.42 to 29.42
Virginia, sil. 2.25 to 2.75.....	28.92 to 29.92
Alabama, sil. 1.75 to 2.25.....	28.10 to 28.60
Alabama, sil. 2.25 to 2.75.....	28.60 to 29.10

Shapes and Plates.—After many changes in plans, the Statler Hotel builders have placed 9000 tons of steel with the American Bridge Co. Bidding for this business was keen and it was taken at a price well under tenders by other companies. The market on shapes is firm at \$2.265 per 100 lb., delivered Boston common rate points, on round tonnages, and at \$2.365 on small. Plate makers are holding firmly at \$2.115, delivered, and asking full extras, whereas heretofore there was shading of the extras. Mill interests intimate advances on shapes and plates of \$5 to \$8 a ton are in the making.

Coke.—Certain brokers report a falling off in by-product foundry coke specifications, while others say business is better. Collectively shipments are holding up well, although present indications are that those for the month will fall considerably below those for August. Both the New England Coal & Coke Co.

and the Providence Gas Co. continue to quote foundry coke at \$12, delivered, where the freight rate does not exceed \$3.10 a ton. Speculation in bituminous coals is increasing as a result of the anthracite strike. Because of that fact local foundry coke prices are strong. Oven interests are making prompt shipments of foundry fuel and are enjoying the biggest domestic fuel business in their history.

Old Material.—With Bridgeport, Conn., and Phillipsdale, R. I., mills out of the market, and with local brokers well covered on eastern Pennsylvania and Pittsburgh district mill orders, heavy melting steel is about 25c. a ton lower. The American Steel & Wire Co., Worcester, Mass., is still buying heavy melting steel at \$15 a ton, delivered, and is taking sizable lots of skeleton at \$10 to \$10.50, on cars shipping point. A round tonnage of forged scrap at \$10 to \$10.50, on cars shipping point, and of machine shop turnings at \$9 to \$9.50, have been bought for eastern Pennsylvania delivery. A Portland, Me., mill is still taking shafting at \$18 to \$18.50, on cars shipping point, and a Norwood, Mass., plant stove plate at \$14.50, delivered. Rolling mills are out of the market for cast iron borings, but steel mills have taken a few lots at \$9.50 on cars. Recent sales include tonnages of No. 1 machinery cast at around \$19, delivered New England consuming points, and textile cast at \$21. Other kinds of old material have very little call.

The following prices are for gross ton lots delivered consuming points:

Textile cast	\$20.00 to \$21.00
No. 1 machinery cast.....	19.00 to 19.50
No. 2 machinery cast.....	15.50 to 16.50
Stove plates	13.50 to 14.00
Railroad malleable	19.00 to 20.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel.....	\$11.50 to \$12.50
No. 1 railroad wrought.....	13.00 to 13.50
No. 1 yard wrought.....	12.00 to 12.50
Wrought pipe (1 in. in diam., over 2 ft. long).....	12.00 to 12.60
Machine shop turnings.....	9.00 to 9.50
Cast iron borings, chemical.....	11.50 to 12.00
Cast iron borings, rolling mill.....	9.00 to 9.50
Blast furnace borings and turnings	8.50 to 9.00
Forged scrap	9.50 to 10.50
Bundled skeleton, long.....	10.00 to 10.50
Forged flashings	10.00 to 10.50
Bundled cotton ties, long.....	9.00 to 9.25
Bundled cotton ties, short.....	10.00 to 10.50
Shaftings	18.00 to 18.50
Street car axles.....	18.00 to 18.50
Rails for rerolling.....	12.50 to 13.50
Scrap rails	11.50 to 12.50

St. Louis

Inquiry for 3000 Tons of Rails—Large Sales of Basic Iron—Scrap Weak

ST. LOUIS, Sept. 22.—Heavy purchases of basic iron for fourth quarter shipment are the feature of the pig iron market. The St. Louis Coke & Iron Co. has sold 10,000 tons to an East side smelter, while Chicago interests have orders for 6000 tons from a St. Louis company specializing in railroad material. The local maker also sold about 2500 tons of foundry iron for prompt shipment, including 1000 tons to a local shop and 900 and 500 tons respectively to other local smelters. Furnaces are well sold up and the market is higher, with the local maker quoting \$22.50 to \$23, f.o.b., Granite City, an advance of \$1, and northern firm at \$21, Chicago. Southern iron ranges from \$18.50 to \$19.50 base, Birmingham. No sizable inquiries are pending. The melt is increasing among gray iron foundries and steel casting shops catering to railroads. Shipments are being asked for in advance of schedules.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices, \$2.16 freight from Chicago, \$5.17 from Birmingham, all rail, and 81c. average switching charge from Granite City:

Northern fdy., all. 1.75 to 2.25...	\$23.16
Northern malleable, all. 1.75 to 2.25	23.16
Basic	23.16
Alabama fdy., all. 1.75 to 2.25 (rail)	\$22.67 to 24.67
Tennessee fdy., all. 1.75 to 2.25...	22.67
Granite City iron, all. 1.75 to 2.25.	23.31 to 23.81

Finished Iron and Steel.—The Kansas City Southern Railway has issued an inquiry for 3000 tons of 100-lb. rails for its 1926 requirements, and it is believed that a larger tonnage will be placed. About 1000 tons of reinforcing bars will be required for road work recently let by the Missouri Highway Commission at Jefferson City. Business in other lines is quiet.

For stock out of warehouse we quote: Soft steel bars, 3.15c. per lb.; iron bars, 3.15c.; structural shapes, 3.25c.; tank plates, 3.25c.; No. 10 blue annealed sheets, 3.60c.; No. 28 black sheets, cold rolled, one pass, 4.50c.; galvanized sheets, No. 28, 5.50c.; black corrugated sheets, 4.65c.; galvanized, 5.65c.; cold-rolled rounds, shafting and screw stock, 3.70c.; structural rivets, 3.65c.; boiler rivets, 3.85c.; tank rivets, $\frac{1}{4}$ in. diameter and smaller, 70 per cent off list; machine bolts, 55 per cent; carriage bolts, 50 per cent; lag screws, 60 per cent; hot pressed nuts, squares, \$3.50; hexagons, blank or tapped, \$4 off list.

Coke.—The increase in price of Eastern coal has added strength to the fuel situation in this section, and a better demand for domestic coke is reported. The demand for foundry coke is fairly active.

Old Material.—Most items in the old material list are lower again this week, the result of continued lack of buying by consumers in this district and weakness in other markets. Users feel that prices are too high to warrant forward buying, but dealers continue to buy supplies to lay down in their yards. Railroad lists closing during the week brought lower prices. The only new list is 1200 tons offered by the St. Louis-San Francisco Railway. Relaying rails are moving well. The demand is for weights from 60-lb. up, with 80 and 85-lb. leading.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Iron rails	\$15.50 to \$16.00
Rails for rolling.....	20.00 to 20.50
Steel rails less than 3 ft.....	19.50 to 20.00
Relaying rails, 60 lb. and under.....	24.00 to 25.00
Relaying rails, 70 lb. and over.....	31.00 to 33.00
Cast iron car wheels.....	18.50 to 19.00
Heavy melting steel.....	15.50 to 16.00
Heavy shoveling steel.....	15.50 to 16.00
Frogs, switches and guards cut apart	18.00 to 18.50
Railroad springs	19.00 to 19.50
Heavy axles and tire turnings.....	13.00 to 13.50
No. 1 locomotive tires.....	17.00 to 17.50
Per Net Ton	
Steel angle bars.....	17.00 to 17.50
Steel car axles.....	18.50 to 19.00
Iron car axles.....	25.50 to 26.00
Wrought iron bars and transoms	19.50 to 20.00
No. 1 railroad wrought.....	13.75 to 14.00
No. 2 railroad wrought.....	13.75 to 14.00
Cast iron borings.....	11.25 to 11.75
No. 1 busheling.....	13.00 to 13.50
No. 1 railroad cast.....	16.00 to 16.50
No. 1 machinery cast.....	17.00 to 17.50
Railroad malleable	14.75 to 15.25
Machine shop turnings.....	8.00 to 8.50
Champion bundled sheets.....	10.00 to 11.25

Cincinnati

Better Business in Finished Steel—Fourth Quarter Pig Iron Buying

CINCINNATI, Sept. 22.—Increased purchases of pig iron have animated the local market. Many consumers, having postponed fourth quarter buying and realizing that the trend of prices is gradually upward, have covered their requirements to forestall further advances. Prices of Northern iron are unchanged and most sales made by producers in the Ironton district are on the basis of \$19.50, furnace. It is reported that one lot of 1000 tons of foundry iron was taken at \$19, base Ironton, which is evidence that inquiries for sizable tonnages are still bringing out low quotations. Orders for single carloads have been taken at \$20, Ironton, but sellers are unable to sustain this price on larger amounts. A second advance in Tennessee iron places it firmly at \$18.50, base Birmingham, while Alabama furnaces are having no trouble in maintaining their quotations of \$19, Birmingham. Jackson County silvery interests have issued a new price schedule, effective Sept. 21, which represents an increase of approximately \$1 a ton over previous quotations. Although the price of 7 per cent silvery is set at \$26, furnace, it is understood that one producer accepted an order

last week for 1000 tons of that grade for Michigan delivery at \$24.50, Jackson. A pickup in Southern iron sales has attracted attention, one seller disposing of 1000 tons of Alabama iron to a Louisville, Ky., melter for September shipment and 500 tons of Tennessee iron to a Pennsylvania consumer for fourth quarter delivery. Two lots of Southern charcoal iron, totaling 900 tons, were sold to western Pennsylvania melters. Activity in malleable grades has been confined to small lots, with \$19.50 to \$20, furnace, as the prevailing price. The Lavelle Foundry Co., Anderson, Ind., is asking for 1000 tons of low phosphorus foundry iron for fourth quarter shipment, while the Louisville & Nashville Railroad has an inquiry out for 600 tons, consisting of Southern, Northern and charcoal iron.

Based on freight rates of \$4.05 from Birmingham and \$2.27 from Ironton we quote f.o.b. Cincinnati:

Alabama fdy., sil. 1.75 to 2.25 (base)	23.05
Alabama fdy., sil. 2.25 to 2.75	\$23.05 to 23.55
Tennessee fdy., sil. 1.75 to 2.25	22.55
Southern Ohio silvery, 8 per cent	28.27
Southern Ohio fdy., sil. 1.75 to 2.25	21.77 to 22.27
Southern Ohio, malleable	21.77 to 22.27

Bars, Plates and Shapes.—Large tonnages were booked by local sellers during the week. The total business, which almost equaled that of the best previous week of the year, indicates that consumers have depleted their meager stocks and of necessity must come into the market to fill their current needs. A Louisville, Ky., buyer is reported to have closed for 700 tons of bars, plates and shapes. Mills are no longer able to make quick deliveries. Bars and shapes can be obtained in four weeks, while plates can be secured in three weeks. Purchases of bars have assumed a livelier aspect and Eastern sellers are endeavoring to establish 2c., base Pittsburgh, as the prevailing quotation. Although this price is applicable to small lots, attractive tonnages continue to bring out quotations of 1.90c., Pittsburgh. The plate market has weakened perceptibly, despite the fact that considerable business is pending. The Big Four railroad is inquiring for 500 tons, while the Louisville & Nashville railroad is expected to buy 350 tons. Sellers have unsuccessfully attempted to advance plate prices from 1.85c., to 1.90c., Pittsburgh. Steady sales of shapes have been made at 2c., but an appreciable tonnage will develop a lower price. Fabricators state that small lettings are numerous. They have been buying structural steel in liberal quantities, but are careful not to order more material than they need for current operations. The Big Four railroad has divided 430 tons for bridges between the McClintic-Marshall Co. and the Bethlehem Steel Co.

Sheets.—An increase in orders, well distributed among the various varieties of sheets, was recorded the past week. One of the leading mills in this territory states that orders exceed shipments for the first time in many months. Production is estimated at approximately 80 per cent of capacity, which is the same rate as the previous week. Increased demand for specialties has been an influential factor in recent sales. Future commitments have accumulated sufficiently to make it impossible for several mills to take business for delivery before the last week in October. Galvanized sheets have fallen back to 4.20c., base, Pittsburgh, and it is only in a few instances that sellers are securing 4.25c. and 4.30c. Quotations on black sheets continue to range from 3c. to 3.15c., Pittsburgh. Blue annealed sheets have acquired strength and are selling at 2.25c. to 2.30c., Pittsburgh. Automobile sheets are displaying little activity, but are firm at 4.25c., Pittsburgh.

Wire Goods.—While the week has been productive of no large orders, specifications covered a substantial tonnage. The Big Four railroad will take bids until Oct. 1, on its fourth quarter requirements in galvanized and barbed wire, woven wire fence and common wire nails. Prices have suffered from the severe competition between Eastern mills and those in Ironton territory. Common wire nails are quoted at \$2.65, base per keg, Pittsburgh, by several sellers, but they are being sold by independent producers at \$2.60, Iron-

ton, which is equivalent to \$2.74, delivered in Cincinnati. A parallel situation exists in plain wire. Although some mills are asking \$2.50 base per 100 lb., Pittsburgh, Ironton sellers have lowered their price to \$2.45, Ironton, or \$2.59, delivered here. It is reported that several important mills are meeting this figure.

Reinforcing Bars.—Price Brothers, Dayton, Ohio, have been awarded the general contract for the Sunrise Avenue bridge, Dayton, calling for 125 tons. No new projects have appeared, although several important jobs are expected to develop in the immediate future. Prices remain firm, with new billet bars quoted at 2c., base Pittsburgh, and rail steel bars at 1.90c., mill.

Warehouse Business.—The volume of business this month is on a par with that of August. A large jobber booked more orders the past week than in any other week in the history of the company. Structural material is moving freely, while consumers are manifesting considerable interest in blue annealed sheets. Improvement is noted in the sale of pipe. No change has been made in prices, with the exception of a slight reduction in bands.

Cincinnati jobbers quote: Iron and steel bars, 3.30c.; reinforcing bars, 3.30c.; hoops, 4c. to 4.25c.; bands, 3.90c.; shapes, 3.40c.; plates, 3.40c.; cold-rolled rounds and hexagons, 3.85c.; squares, 4.35c.; open-hearth spring steel, 4.75c. to 5.75c.; No. 10 blue annealed sheets, 3.60c.; No. 28 black sheets, 4.10c.; No. 28 galvanized sheets, 5.25c.; No. 9 annealed wire, \$3 per 100 lb.; common wire nails, \$2.95 per keg base; cement coated nails, \$2.40 per keg; chain, \$7.55 per 100 lb. base; large round head rivets, \$3.75 base; small rivets, 65 per cent off list. Boiler tubes: prices net per 100 ft. lap welded steel tubes, 2-in., \$18; 4-in., \$38; seamless, 2-in., \$19; 4-in., \$39.

Coke.—Shipments of by-product foundry coke this month have increased 10 per cent as compared with August, although some sales have been recorded at \$10.03, delivered in Cincinnati, sellers have taken business as low as \$9.64. Fair shipments of beehive coke are reported by local dealers. Domestic coke sales are consistently good, operations of by-product coke companies remain at 90 per cent of capacity.

Old Material.—Consumer buying is at a minimum and, consequently, scrap sales have been unimportant. Mills at Portsmouth, Ohio, are holding up deliveries, while other steel plants have liberal stock piles to draw on. Although recent developments have not justified the high prices recently paid by dealers, railroads continue to receive good prices for their offerings. Local dealers took considerable material from the Louisville & Nashville and the Cincinnati Southern the past week. Heavy melting steel is comparatively inactive, but remains at \$15 to \$15.50.

We quote dealers' buying prices, f.o.b. cars, Cincinnati:

Per Gross Ton	
Heavy melting steel	\$15.00 to \$15.50
Scrap rails for melting	14.50 to 15.00
Short rails	18.50 to 19.00
Relaying rails	28.00 to 28.50
Rails for rolling	15.50 to 16.00
Old car wheels	14.00 to 14.50
No. 1 locomotive tires	17.00 to 17.50
Railroad malleable	16.00 to 16.50
Agricultural malleable	15.50 to 16.00
Loose sheet clippings	10.50 to 11.00
Champion bundled sheets	12.00 to 12.50

Per Net Ton	
Cast iron borings	9.00 to 9.50
Machine shop turnings	8.00 to 8.50
No. 1 machinery cast	19.00 to 19.50
No. 1 railroad cast	15.50 to 16.00
Iron axles	23.00 to 23.50
No. 1 railroad wrought	12.00 to 12.50
Pipes and flues	9.00 to 10.00
No. 1 busheling	11.00 to 11.50
Mixed busheling	9.50 to 10.00
Burnt cast	10.00 to 10.50
Stove plate	11.00 to 11.50
Brake shoes	11.00 to 11.50

What is referred to by Executive Director Charles F. Abbott of the American Institute of Steel Construction as the most important meeting ever held by the structural steel industry is that set for White Sulphur Springs, W. Va., Nov. 11 to 14. An educational program is in preparation, and a large representation of steel fabricating companies is expected from all parts of the United States and Canada.

Philadelphia

Pig Iron Higher, Scrap Weaker and Steel Prices Unchanged

PHILADELPHIA, Sept. 22.—Eastern Pennsylvania pig iron, except low phosphorus, has been advanced 50c. a ton, the prices now in effect being \$21, furnace, on No. 2 plain, \$21.50 on No. 2X and \$22 for No. 1X. Basic iron is quoted at \$21 to \$21.50, delivered. The higher prices, which have been predicted for weeks, are due largely to the higher prices for coke, but also to the fact that the furnaces are pretty well sold up until the end of the year and are not anxious for first quarter business at present quotations.

With pig iron strengthening, scrap has weakened. Small lots of heavy melting steel have been bought by Eastern mills at \$17, and some purchases of pickup lots have been made at \$16.50.

Efforts of the steel mills to eliminate price concessions have not been wholly successful. Plates, shapes, bars and sheets all show a degree of weakness, notwithstanding a slight improvement this month in the volume of business.

Pig Iron.—A general advance of 50c. a ton on foundry, malleable, basic and gray forge grades of pig iron has been put into effect by eastern Pennsylvania furnaces. One or two furnaces adopted the new prices of \$21 for No. 2 plain, \$21.50 for No. 2X and \$22 for No. 1X about a week ago, but the remainder of the iron makers did not follow suit until this week. Last week outstanding quotations at the former prices were given a time limit and this resulted in the placing of a number of orders ranging from 500 to 2000 tons. The minimum for Philadelphia delivery of No. 2 plain is now \$21.76, with a 50c. differential for No. 2X. Although there have been no sales of basic, quotations are now not less than \$21, delivered. Some furnaces ask \$20.50, furnace. Malleable iron is on a par with No. 2X. There has been no change on low phosphorus iron, a New York State furnace quoting \$22 to \$23, furnace, but a furnace near Philadelphia, which is now selling copper free iron, has made sales at \$24, furnace. The volume of eastern Pennsylvania business in the past week probably has not exceeded 10,000 to 15,000 tons, and this was at the former prices. At the new prices very little has been done. An inquiry for 5000 tons is pending. Foreign iron prices have advanced in line with domestic prices, being generally on the basis of \$21, c.i.f. Philadelphia, duty paid, for the base grade of foundry iron. Higher coke prices are given as a reason for the advance, but the sold-up condition of most of the furnaces for fourth quarter is an important factor. For spot coke a furnace has paid \$4 a ton, which increases costs about \$1 a ton over a month ago. As furnace operators cannot foresee what may develop in the coke situation, they are not anxious to quote for first quarter, although they have had some inquiry for that period. There is a strong belief that if the anthracite strike is not soon settled both coke and pig iron prices will be higher in the first quarter of the new year. Virginia iron has been sold at \$22, furnace, but the asking price for carload lots is \$22.50, base, furnace. A Virginia cast iron pipe company has contracted for 10,000 tons of Virginia iron for last quarter.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76c. to \$1.63 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	\$21.76 to \$22.13
East. Pa. No. 2X, 2.25 to 2.75 sil.	22.26 to 22.63
East. Pa. No. 1X	22.76 to 23.13
Virginia No. 2 plain, 1.75 to 2.25 sil.	27.67 to 28.67
Virginia No. 2X, 2.25 to 2.75 sil.	28.17 to 29.17
Basic delivery eastern Pa.	21.00 to 21.50
Gray forge	21.00 to 22.00
Malleable	22.25 to 22.75
Standard low phos. (f.o.b. furnace)	22.00 to 24.00
Copper bearing low phos. (f.o.b. furnace)	22.50 to 23.50

Ferroalloys.—The price of ferromanganese remains firm at \$115, seaboard or domestic furnace. Inquiry is very light.

Billets.—Users of billets have tried to obtain concessions, but mills have stood firm for \$35, Pittsburgh, for rerolling billets and \$40 for forging billets.

Plates.—One or two plate mills report a slight increase in orders, but generally the Eastern plate situation continues unsatisfactory to the mills, both as to volume of business and prices. While small lots are being sold at 1.80c., Pittsburgh, the general quotation on sizable lots is now 1.75c., with sales having been made in exceptional cases at 1.70c. The Chesapeake & Ohio Railroad has ordered 50 locomotives from the American Locomotive Co.

Structural Material.—With no betterment in prices, demand for structural shapes continues fairly good, orders so far this month showing a slight gain over August. Some of the larger producers are getting 1.90c., Pittsburgh, but other mills have made sales at 1.80c. and 1.85c., Pittsburgh.

Bars.—Although one or two mills have withdrawn quotations of 1.90c., Pittsburgh, on steel bars, there is still business on that basis. The average buyer is being asked to pay 2c., the lower price being extended only to large users. Bar iron is quoted by Eastern makers at the equivalent of 1.80c. to 1.85c., Pittsburgh.

Sheets.—Efforts of some of the independent mills to advance sheet prices have had a good trial, but the result has not been successful, due largely to the fact that the leading interest has not advanced its quotations. The range on galvanized sheets is 4.20c. to 4.30c., Pittsburgh. Many buyers are having no difficulty in buying at the lower figure. On black sheets some business is being taken at 3.10c., although 3.15c. and 3.20c. are being quoted. Likewise on blue annealed concessions from 2.30c., Pittsburgh, amount to \$1 or \$2 a ton.

Warehouse Business.—There have been no changes in warehouse prices. From the jobbers' viewpoint the price situation is much more satisfactory than that which existed a month or so ago.

Imports.—England is again sending fairly large lots of pig iron, a shipment of 6572 tons having come in last week; of Indian iron there was 1527 tons and of Luxemburg iron 100 tons. Other imports last week were 617 tons of steel blooms from France; 123 tons of steel bars from Luxemburg; 373 tons of structural steel from Luxemburg and 35 tons of structural steel from Germany.

Old Material.—The scrap market has shown further signs of softening. Two mills have bought moderate-size tonnages of heavy melting steel at \$17, delivered, and another mill has bought pick-up lots from nearby scrap yards at \$16.50. The general market on steel scrap is scarcely as low as \$16.50, but \$17 to \$17.50 is a fair range. A steel plant which uses stove plate and grate bars bought those grades at \$15, but then reduced its price to \$14.50. No. 1 railroad wrought is slightly higher at \$18 to \$18.50, but this is a development not indicative of the general market trend.

We quote for delivery, consuming points in this district, as follows:

No. 1 heavy melting steel	\$17.00 to \$17.50
Scrap rails	17.00 to 17.50
Steel rails for rolling	18.50 to 19.00
No. 1 low phos. heavy 0.04 and under	21.50 to 22.00
Couplers and knuckles	21.00 to 21.50
Rolled steel wheels	21.00 to 21.50
Cast iron car wheels	18.50 to 19.00
No. 1 railroad wrought	18.00 to 18.50
No. 1 yard wrought	17.00 to 17.50
No. 1 forge fire	14.50 to 15.00
Bundled sheets (for steel works)	14.00 to 14.50
Mixed borings and turnings (for blast furnace use)	13.00 to 13.50
Machine shop turnings (for steel works use)	14.00 to 14.50
Machine shop turnings (for rolling mill use)	14.50 to 15.00
Heavy axle turnings (or equivalent)	15.50 to 16.00
Cast borings (for steel works and rolling mill)	14.00
Cast borings (for chemical plant)	16.00 to 16.50
No. 1 cast	18.00 to 18.50
Heavy breakable cast (for steel plants)	17.00 to 17.50
Railroad grate bars	14.50 to 15.00
Stove plate (for steel plant use)	14.50 to 15.00
Wrought iron and soft steel pipes and tubes (new specifications)	16.50 to 17.00
Shafting	24.00 to 25.00
Steel axles	24.50 to 25.50

Cleveland

Fourth Quarter Steel Buying—Lake Boat Contracts

CLEVELAND, Sept. 22.—Forward buying is the outstanding feature of the iron and steel market. The week has brought out considerable fourth quarter business, largely in steel bars, although some contracts have been taken for plates, structural material and other products. Some of the buyers have placed contracts for bars in considerably larger tonnages than they originally inquired for. The volume of current orders is still showing some gain from week to week. The steel trade is more optimistic than for a long time and some look for a volume of business in the fourth quarter fully as large as in the first quarter of this year and possibly larger. Buying is well distributed among various consuming industries. Orders from automobile and parts makers show little falling off and motor car builders claim that a curtailment in production is not yet in sight. However, little new steel business is developing outside of the manufacturing field. A lull has come in building activities, although fabricating shops are comfortably filled with work. The Midland Shipbuilding Co., Midland, Ont., has taken a large freight boat requiring 5000 tons of plates and the Great Lakes Towing Co., Cleveland, will build two tugs requiring 400 tons of plates. Prices on steel bars appear to be definitely established at 2c., Pittsburgh, in this territory and the tonnage booked for fourth quarter has been taken at that price.

However, in Detroit, which has been a weak point in the bar market, 1.90c. has not disappeared, although the market there shows more strength. On plates the range is from 1.80c. to 1.90c., with the lower quotation more common. On structural shapes 1.90c. still rules, although some of the mills are getting 2c. on small lots.

Pig Iron.—Sales fell off the past week and as most consumers are apparently under contract for the fourth quarter, not a great deal of activity is looked for during the next few weeks, or at least until the first quarter buying movement starts. A Lake furnace has made a few small lot sales for the first quarter at \$20.50, or 50c. above its maximum fourth quarter price, but not much inquiry has come out for that delivery and furnaces are trying to avoid quoting that far ahead. In fact, one producer has virtually withdrawn from the market because of uncertainty over the coke situation. Prices remain the same as a week ago. Valley furnaces are adhering to \$19 on foundry and malleable iron but Valley iron in the hands of a broker is still available at \$18.50, Valley furnace. Although the Valley price has been advanced, Cleveland furnaces have made no advance for Cleveland delivery in their quotation of \$19.50, furnace, which has prevailed for some time, and it has developed that this price was shaded recently. For outside shipment \$19 furnace is the ruling price. One Lake furnace is still on a \$20 to \$20.50 basis and in Michigan territory the price range is from \$20.50 to \$21. One producer made a large number of sales during the week aggregating 15,000 tons. Another sold 5000 tons in several lots. An Indiana melter placed 500 tons of malleable iron with a Cleveland furnace. A Mansfield, Ohio, stove maker placed 500 tons of foundry iron. A Chicago consumer purchased 1000 tons of low phosphorus iron from a Valley maker at \$27.50, furnace, but this producer is taking a somewhat firmer stand on prices and has been able to get \$28 for a small tonnage.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a \$3.02 freight rate from Jackson and \$6 from Birmingham:

Basic, Valley furnace.....	\$18.50
N'th'n No. 2 fdy., sil. 1.75 to 2.25	20.00
Southern fdy., sil. 1.75 to 2.25...	24.01 to 25.51
Malleable	20.00
Ohio silvery, 8 per cent.....	29.02
Standard low phos., Valley furnace	27.50 to 28.00

Alloy Steel.—Demand is holding up well owing to the continued large operations by automobile manu-

facturers, but most car builders are now buying from month to month. Producers have become somewhat more anxious for orders and the market is not so firm as a few weeks ago. Consequently the minimum quotations, on page 863, have become more common.

Semi-Finished Steel.—For sheet bars \$35, Cleveland and Youngstown, is still the asking price, but \$33.50, Youngstown, is regarded as nearer the market and the last sale reported was at that price. Slabs and large billets are unchanged at \$33.50, Youngstown. Mills are comfortably booked but no new business is reported.

Sheets.—Weak spots have again developed in black sheets on which some mills have gone to as low as 3.05c., Pittsburgh, with some fourth quarter contracts reported as placed at that price. However, most mills are taking a firmer stand on prices and a number are getting orders for black at 3.15c. Most producers are holding to 2.30c. for blue annealed sheets, although these are still available at 2.25c. While 4.30c. is the more common asking price on galvanized sheets and sales are being made at that price, these sheets can still be bought at 4.20c. The volume of sheet business is quite satisfactory. Most Ohio mills are quoting on a Youngstown or mill base, which is an advantage to buyers in this territory.

Screw Stock.—The weakness in the market previously reported continues. The regular 2.55c. Cleveland price is being shaded \$2 or more a ton mostly on hexagon material that carries much larger extras than round bars. Some business in hexagon stock is being taken at net prices.

Reinforcing Bars.—The Ohio Bell Telephone Co. has taken bids for 500 tons for its main building in Cleveland and the Ohio Highway Commission will open bids Sept. 25 for road work requiring considerable steel. However, orders and inquiries have fallen off. The market is firmer although a 1.75c. price has not entirely disappeared for round lots.

Strip Steel.—The market is firm and some business in fourth quarter contracts in both hot and cold rolled strip steel is being taken at the regular quotations.

Iron Ore.—Blast furnaces using Lake ore consumed 4,020,280 tons in August, or a gain of 177,929 tons over the previous month. The amount consumed in August, 1924, was 2,635,759 tons. The amount of Lake Superior ore on hand at furnaces Sept. 1, was 28,271,850 tons, and the quantity at furnaces and Lake Erie docks was 34,605,270 tons, or over 1,000,000 less than a year ago, when the amount on hand Sept. 1, was 35,703,093 tons. There were 161 blast furnaces in operation using lake ore on Sept. 1, or a gain of two for the month.

Coke.—Domestic coke is weaker, as the buying spurt by dealers has subsided. Heating coke has advanced 25c. a ton more and is quoted at \$3.75 to \$4. Foundry coke is unchanged at \$4.75 for the better grades of Connellsville coke, and \$5 for premium grades. Buying by foundries is very light.

Old Material.—In the absence of any consumer demand the market has weakened. This is particularly true of borings and turnings owing to the holding up of shipments of blast furnace scrap by a local consumer. Despite inactivity, scrap continues to move in fair volume, as dealers still have unfilled orders and about all the material that is coming into the market is being absorbed. Quotations on many of the grades are regarded as nominal.

We quote dealers' prices f.o.b. Cleveland per gross ton:

Heavy melting steel.....	\$16.50 to \$17.00
Rails for rolling.....	17.00 to 17.50
Rails under 3 ft.....	19.00 to 19.50
Low phosphorus melting.....	18.00 to 18.25
Cast iron borings.....	13.50 to 13.75
Machine shop turnings.....	12.50 to 12.75
Mixed borings and short turnings.....	13.50 to 13.75
Compressed sheet steel.....	15.50 to 15.75
Railroad wrought	13.50 to 14.00
Railroad malleable	19.00 to 19.50
Light bundled sheet stampings..	12.00 to 12.25
Steel axle turnings.....	15.00 to 15.50
No. 1 cast.....	18.00 to 18.50
No. 1 busheling.....	14.00 to 14.25
Drop forge flashings.....	13.00 to 13.50
Railroad grate bars.....	13.50 to 13.75
Stove plate	13.50 to 13.75
Pipes and flues.....	12.00 to 12.25

NON-FERROUS METALS

The Week's Prices

Cents per Pound for Early Delivery

Sept.	Copper, New York		Straits Tin (Spot)	Lead		Zinc	
	Lake	Electro- lytic*		New York	St. Louis	New York	St. Louis
16.....	15.00	14.62½	59.12½	9.55	9.25	8.10	7.75
17.....	14.87½	14.50	59.00	9.55	9.25	8.10	7.75
18.....	14.87½	14.37½	58.75	9.55	9.25	8.15	7.80
19.....	14.87½	14.37½	.....	9.55	9.25	8.15	7.80
21.....	14.87½	14.50	58.75	9.55	9.25	8.17½	7.82½
22.....	14.87½	14.50	58.50	9.55	9.25	8.20	7.85

*Refinery quotation; delivered price ¼c. higher.

New York

NEW YORK, Sept. 22.

Activity in the non-ferrous markets is only moderate. Buying of copper is still light. Transactions in the tin market have been confined to dealers. The lead market is practically unchanged. Zinc has continued to advance and is quite strong.

Copper.—Some sellers report a fair amount of business and others state that buying is very light. There is a difference of opinion as to the price at which the metal can be bought, some insisting that all sellers are at 14.75c., delivered, while at least one states that plenty of the metal is available at 14.52½c., delivered. Consumers are evidently well covered for this month and possibly for October and are not at all active. There is also very little buying from abroad. A tendency to weakness under these conditions would therefore be natural. Producers, however, are in a comfortable position, and expect considerable buying by consumers in the near future. Lake copper is quoted at 14.87½c., delivered.

Tin.—Sales last week up to Saturday totaled 600 to 700 tons, practically all transactions being between dealers and speculators. Consumers were practically out of the market. Yesterday and today the market has been nearly stagnant. There have been no features. London prices today were slightly higher than a week ago, with spot standard quoted at £261 12s. 6d., future standard at £262 17s. 6d. and spot Straits at £268 12s. 6d. per ton. The Singapore price was £269. Today spot Straits tin in this market is quoted at 58.50c., New York. Arrivals thus far this month have been 8675 tons, with 5520 tons reported afloat.

Lead.—The market is quiet but firm and very little business is reported. Conditions were about the same as a week ago. The leading interest still maintains its contract price at 9.50c., New York, at which it is doing some business. In the outside market sales are being made at 9.25c., St. Louis, equivalent to 9.60c. in the East. We quote the market at 9.25c., St. Louis, and 9.55c., New York.

Zinc.—As outlined a week ago, good demand from galvanizers and the probability of considerable buying from abroad have been factors in a strong market. Prices have continued to advance until prime Western zinc is quoted today at 7.85c. to 7.87½c., St. Louis, or 8.20c. to 8.22½c., New York.

Old Metals.—Dealers' selling prices, which are about the same as last week, are as follows in cents per lb.:

Copper, heavy and crucible.....	14.25
Copper, heavy and wire.....	13.25
Copper, light and bottoms.....	11.75
Heavy machine composition.....	10.25
Brass, heavy.....	8.75
Brass, light.....	7.75
No. 1 red brass or composition turnings.....	9.75
No. 1 yellow rod brass turnings.....	9.50
Lead, heavy.....	8.50
Lead, tea.....	7.00
Zinc.....	5.25
Cast aluminum.....	20.50
Sheet aluminum.....	20.50

Nickel.—Wholesale lots of ingot nickel are quoted at 34c., with shot nickel at 35c. Electrolytic nickel is quoted at 38c.

Antimony.—Chinese metal in wholesale lots for spot delivery is quoted at 17c., New York, duty paid.

Metal for arrival for September-October is quoted at 16.62½c., with shipment from China in those months at 16c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is unchanged at 27c. to 28c. per lb., delivered.

Chicago

SEPT. 22.—Tin and zinc have advanced slightly, and copper, lead and antimony remain unchanged. The old metal market is steady, with prices unaltered. We quote, in carload lots: Lake copper, 14.87½c.; tin, 60c.; lead, 9.40c.; zinc, 7.90c.; in less than carload lots, antimony, 19c. On old metals we quote copper wire, crucible shapes and copper clips, 11.50c.; copper bottoms, 10c.; red brass, 9c.; yellow brass, 7.75c.; lead pipe, 8c.; zinc, 4.50c.; pewter, No. 1, 32.50c.; tin foil, 41c.; block tin, 46c.; all being dealers' buying prices for less than carload lots.

FAR EAST QUIET

Small Tin Plate and Rail Inquiries from Japan —China Asks for Rails

NEW YORK, Sept. 22.—Inquiry from Far Eastern markets continues light, but in the case of requests for prices by Japanese merchants, most of the current inquiry is apparently developing into business. Probably 75 per cent of the recent inquiries from Japan for small lots of canners' quality tin plate have been placed with American mills. In addition to the small lot of boiler plates for which the South Manchuria Railway is in the market, there is a small tonnage of boiler tubes, about 6000 pieces. While there are no large rail inquiries for Japan, the Kei-Hin Electric Railway is asking for 2½ miles of 100-lb. high T-rails, and Tokio municipality is in the market for 6 miles of 94-lb. grooved rails. The light gage black sheet market in Japan is quiet. Stocks are believed to have been somewhat reduced, so that the pressure of low offerings from stocks in Japan is not so pronounced as recently, when prices down to \$80 per ton were being made by merchants in competition with British quotations of \$82 to \$83 per ton, c.i.f., and American prices of \$84 to \$85 per ton, c.i.f. Japan.

While there is a fair volume of inquiry from China, actual business is small. Exporters report available lots of wire shorts small and practically no tin plate waste is available at present from the mills, the supply having been bought ahead. A small building contract involving about 100 tons of structural steel and 100 tons of sheets was recently booked by an export company in New York. A large rail inquiry from China closed on Sept. 21; specifications called for 16,000 tons of 85-lb. sections. According to information received by exporters dealing with China this inquiry has no connection with a recent request for prices on the same tonnage of relaying rails, the order for which was never placed.

Takata & Co., Ltd., recently incorporated for 3,000,000 yen in Japan and with an American office at 143 Broadway, is not connected financially or otherwise with Takata & Co., the trading company now being liquidated, according to J. N. Murray, American representative of the new company. The new company will maintain a main office in Tokio, with branches in Osaka, Moji, Nagoya, Otaru, New York, and London, handling exports and imports of iron, steel, non-ferrous metals, machinery, electrical instruments and apparatus, chemicals and other products. The president of the new company is B. Sugino, a former director of the Takata company, and on the board of directors are a number of former directors and men associated with the old company. Among the directors are Katsuro Wada, formerly a traffic manager in Tokio and for five years in New York; Shigetoshi Shiboi, former Osaka manager; Sumio Wishazaki, formerly manager of the electrical department in Tokio; Toshiyuki Kirakawa, manager of the material department in Tokio and formerly of the Hamburg office; and Shigema Furumi, formerly manager of the administrative department in Tokio.

Prices of Finished Iron and Steel Products (Carload Lots)

Tank Plates

F.o.b. Pittsburgh mill, base, per lb.....1.80c. to 1.90c.
F.o.b. Chicago, base, per lb.....2.10c.

Structural Shapes

F.o.b. Pittsburgh mill, base, per lb.....1.90c. to 2c.
F.o.b. Chicago, base, per lb.....2.10c.

Iron and Steel Bars

Soft steel bars, f.o.b. P'gh mills, base, per lb....1.90c. to 2c.
Soft steel bars, f.o.b. Chicago, base, per lb.....2.10c.
Reinforcing steel bars, f.o.b. P'gh mills, per lb....1.90c. to 2c.
Rail steel bars, f.o.b. Chicago and f.o.b. Chicago district mills, base, per lb.....2.00c.
Common iron bars, f.o.b. Chicago, base, per lb....1.90c. to 2.00c.
Refined iron bars, f.o.b. P'gh mills, base, per lb.....3.00c.
Common iron bars, eastern Pa. mill, base, per lb.....2.10c.

Hot-Rolled Flats

Hoops, base (6 in. and narrower), per lb., Pittsburgh..2.40c.
Bands, base (6 in. and narrower), per lb., Pittsburgh..2.40c.
Strips, 6 in. and narrower, base, per lb., Pittsburgh..2.40c.
Strips wider than 6 in., base, per lb., Pittsburgh.....2.20c.
Strips, 6 in. and narrower, Chicago.....2.40c. to 2.50c.
Strips wider than 6 in., Chicago.....2.30c. to 2.40c.
Cotton ties, per 45 lb. bundle, f.o.b. Atlantic ports.....\$1.28
Cotton ties, per 45 lb. bundle, f.o.b. Gulf ports.....1.25

Cold-Finished Steel

Screw stock and shafting, f.o.b. P'gh mills, base, per lb..2.50c.
Screw stock and shafting, f.o.b. Chicago, base, per lb..2.50c.
Screw stock, base, per lb., Cleveland.....2.45c. to 2.55c.
Shafting, ground, f.o.b. mill, base, per lb.....2.80c. to 3.00c.
Strips, f.o.b. P'gh mills, base, per lb.....3.75c.
Strips, f.o.b. Cleveland mills, base, per lb.....3.75c.
Strips, delivered Chicago, base, per lb.....4.05c.
Strips, f.o.b. Worcester mills, base, per lb.....3.90c.

Wire Products

(To jobbers in car lots f.o.b. Pittsburgh and Cleveland)

Nails, base, per keg.....\$2.65
Galvanized nails, 1-in. and longer, base plus.....2.00
Galvanized nails, shorter than 1 in., base plus.....2.25
Bright plain wire, base, No. 9 gage, per 100 lb.....2.50
Annealed fence wire, base, per 100 lb.....2.65
Spring wire, base, per 100 lb.....3.50
Galvanized wire, No. 9, base, per 100 lb.....3.10
Galvanized barbed, base, per 100 lb.....3.35
Galvanized staples, base, per keg.....3.35
Painted barbed wire, base, per 100 lb.....3.10
Polished staples, base, per keg.....3.10
Cement coated nails, base, per count keg.....1.85
*Bale ties, carloads, to jobbers...75, 15 and 5 per cent off list
*Bale ties, carloads, to retailers...75, 10 and 6 per cent off list
Woven wire fence, base, per net ton to retailers.....\$65
Chicago district mill and delivered Chicago prices are \$1 per ton above the foregoing. Birmingham mill prices \$3 a ton higher; Worcester, Mass., mill \$3 a ton higher on production of that plant, and Duluth, Minn., mills \$2 a ton higher; Anderson, Ind., \$1 higher.

*F.o.b. Cleveland.

Sheets

Blue Annealed
(base) per lb.

Nos. 9 and 10, f.o.b. Pittsburgh.....2.25c. to 2.30c.
Nos. 9 and 10 (base) per lb., f.o.b. Chicago dist. mills, 2.40c. to 2.45c.

Box Annealed, One Pass Cold Rolled

No. 28 (base) per lb., f.o.b. Pittsburgh.....3.10c. to 3.20c.
No. 28 (base) per lb., f.o.b. Chicago dist. mill..3.30c. to 3.35c.

Galvanized

No. 28 (base) per lb., f.o.b. Pittsburgh.....4.20c. to 4.30c.
No. 28 (base) per lb., f.o.b. Chicago dist. mill..4.35c. to 4.40c.

Tin-Mill Black Plate

No. 28 (base) per lb., f.o.b. Pittsburgh.....3.10c. to 3.20c.
No. 28 (base) per lb., f.o.b. Chicago dist. mill..3.30c. to 3.35c.

Automobile Body Sheets

No. 22 (base) per lb., f.o.b. Pittsburgh.....4.25c.

Long Ternes

No. 28 (base) 8-lb. coating, per lb., f.o.b. mill..4.60c. to 4.75c.

Tin Plate

Standard cokes, per base box, f.o.b. Pittsburgh district mills.....\$5.50
Standard cokes, per base box f.o.b. Chicago district mills 5.60
Standard cokes, per base box f.o.b. Elwood, Ind.....5.60

Terne Plate

(F.o.b. Morgantown or Pittsburgh)

(Per package, 20 x 28 in.)

8-lb. coating, 100 lb. base.....\$11.20	20-lb. coating I. C....\$15.50
8-lb. coating I. C....11.50	25-lb. coating, I. C....17.00
15-lb. coating I. C....14.35	30-lb. coating I. C....18.35
	40-lb. coating, I. C....20.35

Rivets

Large, f.o.b. P'gh and Cleveland mills, base, per 100 lb.....\$2.40 to \$2.50
Large, f.o.b. Chicago, base, per 100 lb.....2.60 to 2.65
Small, f.o.b. Pittsburgh.....70, 10 and 5 per cent off list
Small, Cleveland.....70, 10 and 5 per cent off list
Small, Chicago.....70, 10 and 10 per cent off list

Rails and Track Equipment

(F.o.b.)

Rails, standard, per gross ton.....\$43.00
Rails, light, billet, base, per lb.....1.65c. to 1.70c.
Rails, light rail steel, base, per lb.....1.50c. to 1.60c.
Spikes, 3/4 in. and larger, base, per 100 lb.....\$2.80 to \$3.00
Spikes, 1/2 in. and smaller, base, per 100 lb.....3.00 to 3.25
Spikes, boat and barge, base, per 100 lb.....3.25
Track bolts, all sizes, base, per 100 lb.....3.90 to 4.25
Tie plates, per 100 lb.....2.35 to 2.40
Angle bars, base, per 100 lb.....2.75

Welded Pipe

(F.o.b. Pittsburgh district mills)

Butt Weld

Inches	Steel Black	Galv.	Inches	Iron Black	Galv.
1/4	45	19 1/2	1/4 to 3/8	+11	+39
1/2	51	25 1/2	3/8	22	2
3/4	56	42 1/2	3/4	28	11
1	60	48 1/2	1 to 1 1/2	30	13
1 to 3	62	50 1/2			

Lap Weld

2	55	43 1/2	2	23	7
2 1/2 to 6	59	47 1/2	2 1/2	26	11
7 and 8	56	43 1/2	3 to 6	28	13
9 and 10	54	41 1/2	7 to 12	26	11
11 and 12	53	40 1/2			

Butt Weld, extra strong, plain ends

1/4	41	24 1/2	2 to 3	61	50 1/2
1/2 to 3/8	47	30 1/2	3/8 to 1 1/2	+11	+54
1/2	53	42 1/2	1 1/2	21	7
3/4	58	47 1/2	3/4	28	12
1 to 1 1/2	60	49 1/2	1 to 1 1/2	30	14

Lap Weld, extra strong, plain ends

2	53	42 1/2	2	23	9
2 1/2 to 4	57	46 1/2	2 1/2 to 4	29	16
4 1/2 to 6	56	45 1/2	4 1/2 to 6	28	14
7 to 8	52	39 1/2	7 to 8	21	7
9 and 10	45	32 1/2	9 to 12	16	2
11 and 12	44	31 1/2			

To the large jobbing trade the above discounts on steel pipe are increased (on black) by one point, with supplementary discount of 5 per cent and (on galvanized) by 1 1/2 point, with supplementary discount of 5 per cent. On iron pipe, both black and galvanized, the preferentials to large jobbers are 1, 5 and 2 1/2 per cent beyond the above discount.

NOTE—The above discounts on steel pipe also apply at Lorain, Ohio. Chicago district mills have a base 2 points less. Chicago delivered base 2 1/2 points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point having the lowest rate to destination.

Boiler Tubes

(F.o.b. Pittsburgh)

Lap Welded Steel	Charcoal Iron
2 to 2 1/4 in.....27	1 1/4 in.....+18
2 1/4 to 2 1/2 in.....37	1 1/4 to 1 1/2 in.....+8
3 in.....40	2 to 2 1/4 in.....2
3 1/4 to 3 1/2 in.....42 1/2	2 1/4 to 3 in.....7
4 to 13 in.....46	3 1/4 to 4 1/2 in.....9

Beyond the above discounts, 5 to 6 fives extra are given on lap welded steel tubes and 2 tens on charcoal iron tubes.

Standard Commercial Seamless Boiler Tubes Cold Drawn

1 in.....60	3 in.....45
1 1/4 and 1 1/2 in.....52	3 1/4 to 3 1/2 in.....47
1 3/4 in.....36	4 in.....50
2 to 2 1/4 in.....31	4 1/2, 5 and 6 in.....45
2 1/2 and 2 3/4 in.....39	

Hot Rolled

2 and 2 1/4 in.....34	3 1/4 to 3 1/2 in.....50
3 1/2 and 2 3/4 in.....42	4 in.....53
3 in.....48	4 1/2, 5 and 6 in.....48

Less carloads, 4 points less. Add \$8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tube list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing (New List)

Carbon 0.10 to 0.30 base.....50 to 55 per cent off list
Carbon 0.30 to 0.40 base.....45 to 50 per cent off list
Plus differentials for lengths over 18 ft. and for commercially exact lengths. Warehouse discounts on small lots are less than the above.

Prices of Iron and Steel Products and Raw Materials

Ores

<i>Lake Superior Ores, Delivered Lower Lake Ports</i>	
Old range Bessemer, 51.50 per cent iron.....	\$4.55
Old range non-Bessemer, 51½ per cent iron.....	4.40
Mesaba Bessemer, 51.50 per cent iron.....	4.40
Mesaba non-Bessemer, 51.50 per cent iron.....	4.25
High phosphorus iron, 51.50 per cent.....	4.15
<i>Foreign Ore, per Unit, c.i.f. Philadelphia or Baltimore</i>	
Iron ore, low phos., copper free, 55 to 58 per cent iron in dry Spanish or Algerian	9.50c. to 10c.
Iron ore, Swedish, average 66 per cent iron	9.50c.
Manganese ore, washed, 51 per cent manganese, from the Caucasus.....	45c.
Manganese ore, Brazilian or Indian, nominal	42c.
Tungsten ore, high grade, per unit, in 60 per cent concentrates.....	\$12.00 to \$13.00
Chrome ore, Indian basic, 48 per cent Cr ₂ O ₃ , crude, per ton, c.i.f. Atlantic seaboard..	20.50 to 24.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS ₃ , New York.....	65c. to 70c.

Coke and Coal

(Per Net Ton)

Furnace coke, f.o.b. Connellsville prompt.....	\$3.75
Foundry coke, f.o.b. Connellsville prompt.....	4.25 to 5.00
Mine run steam coal, f.o.b. W. Pa. mines.....	1.50 to 2.10
Mine run coking coal, f.o.b. W. Pa. mines.....	1.65 to 1.90
Mine run gas coal, f.o.b. W. Pa. mines.....	2.00 to 2.25
Steam slack, f.o.b. W. Pa. mines.....	1.25 to 1.35
Gas slack, f.o.b. W. Pa. mines.....	1.50 to 1.60

Ferroalloys

Ferromanganese, domestic, 80 per cent, furnace, or seaboard, per ton.....	\$115.00
Ferromanganese, foreign, 80 per cent, f.o.b. Atlantic port, duty paid.....	115.00
Ferrosilicon, 50 per cent, delivered.....	\$2.50 to \$5.00
Ferrosilicon, 75 per cent.....	145.00 to 147.50
Ferrotungsten, per lb. contained metal.....	1.15 to 1.20
Ferrochromium, 4 per cent carbon and up, 60 to 70 per cent Cr., per lb. contained Cr. delivered.....	11.50c.
Ferrovandium, per lb. contained vanadium	\$3.50 to \$4.00
Ferrocobaltitium, 15 to 18 per cent, per net ton.....	200.00

Spiegeleisen, Bessemer Ferrosilicon and Silvery Iron

(Per gross ton furnace unless otherwise stated)

Spiegeleisen, domestic, 19 to 21 per cent.....	\$32.00
Spiegeleisen, domestic, 16 to 19 per cent.....	31.00
Ferrosilicon, Bessemer, 10 per cent, \$32; 11 per cent, \$34.50; 12 per cent, \$36.50 to \$37; electric furnace ferrosilicon, 10 per cent, \$38 furnace; 11 per cent, \$38; 12 per cent, \$38; 14 to 16 per cent, \$45.	
Silvery iron, 6 per cent, \$25; 7 per cent, \$26; 8 per cent, \$27; 9 per cent, \$28.50; 10 per cent, \$30.50; 11 per cent, \$32.50; 12 per cent, \$34.50.	

Fluxes and Refractories

Fluorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica, gravel, per net ton, f.o.b. Illinois and Kentucky mines.....	\$16.00
No. 2 lump, per net ton.....	19.00
Fluorspar, foreign, 85 per cent calcium fluoride, not over 5 per cent silica, c.i.f. Philadelphia, duty paid, per net ton.....	16.00
Fluorspar, No. 1 ground bulk, 95 to 98 per cent calcium fluoride, not over 2½ per cent silica, per net ton, f.o.b. Illinois and Kentucky mines.....	32.50
<i>Per 1000 f.o.b. works:</i>	
<i>Fire Clay</i>	
Pennsylvania.....	\$43.00 to \$46.00
Maryland.....	48.00 to 50.00
Ohio.....	43.00 to 46.00
Kentucky.....	43.00 to 45.00
Illinois.....	43.00 to 45.00
Missouri.....	40.00 to 43.00
Ground fire clay, per ton.....	6.50 to 7.50
<i>Silica Brick:</i>	
Pennsylvania.....	40.00
Chicago.....	49.00
Birmingham.....	54.00
Silica clay, per ton.....	8.00 to 9.00
<i>Magnesite Brick:</i>	
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.).....	65.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.).....	40.00
<i>Chrome Brick:</i>	
Standard size, per net ton.....	48.00

Bolts and Nuts

<i>(F.o.b. Pittsburgh, Cleveland, Birmingham and Chicago)</i>	
Machine bolts, small rolled threads.. 50 and 10 per cent off list	
Machine bolts, all sizes, cut threads.....	50, 10 and 10 per cent off list
Carriage bolts, smaller and shorter, rolled threads.....	50, 10 and 10 per cent off list
Carriage bolts, cut threads, all sizes.....	50 and 10 per cent off list
Eagle carriage bolts.....	65 and 10 per cent off list
Lag bolts.....	60, 10 and 10 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads.....	50 and 10 per cent off list
Other style heads.....	20 per cent extra

Machine bolts, c.p.c. and t. nuts, ½ x 4 in..

Larger and longer sizes.....	45, 10 and 5 per cent off list
Hot-pressed nuts, blank and tapped, square.....	4c. off list
Hot-pressed nuts, blank or tapped, hexagons.....	4.40c. off list
C.p.c. and t. square or hex. nuts, blank or tapped.....	4.10c. off list
Bolt ends with hot pressed nuts.....	50, 10 and 10 per cent off list
Bolt ends with cold pressed nuts.....	45, 10 and 5 per cent off list
Washers.....	6.50c. to 6.25c. off list

*F.o.b. Chicago and Pittsburgh.

The discount on machine, carriage and lag bolts is 5 per cent less than above for less than car lots. On hot pressed and cold punched nuts the discount is 25c. less per 100 lb. than quoted above for less than car lots.

(Quoted with freight allowed within zone limits)

Semi-finished hex. nuts:

½ in. and smaller, U. S. S.....	80, 10 and 5 per cent off list
¾ in. and larger, U. S. S.....	75, 10 and 5 per cent off list
Small sizes, S. A. E.....	80, 10, 10 and 5 per cent off list
S. A. E., ½ in. and larger.....	75, 10, 10 and 5 per cent off list
Stove bolts in packages.....	80, 10 and 5 per cent off list
Stove bolts in bulk.....	80, 10, 5 and 2½ per cent off list
Tire bolts.....	50, 10 and 5 per cent off list

Semi-Finished Castellated and Slotted Nuts

(Prices delivered within specified territories)

(To jobbers and consumers in large quantities)

Per 100 Net		Per 100 Net	
S. A. E.	U. S. S.	S. A. E.	U. S. S.
¼-in.....	\$0.44	¾-in.....	\$2.35
½-in.....	.515	1-in.....	3.60
¾-in.....	.62	1¼-in.....	5.65
1-in.....	.79	1½-in.....	8.90
1¼-in.....	1.01	1¾-in.....	12.60
1½-in.....	1.38	2-in.....	18.35
2-in.....	1.70	2½-in.....	21.00

Larger sizes—Prices on application.

Cap and Set Screws

(Freight allowed within zone limits)

Milled cap screws.....	80, 10 and 5 per cent off list
Milled standard set screws, case hardened.....	80 and 10 per cent off list
Milled headless set screws, cut thread.....	80 and 10 to 80 per cent off list
Upset hex. head cap screws, U. S. S. Thread.....	80, 10, 10 and 5 per cent off list
Upset hex. cap screws, S. A. E. Thread.....	80, 10 and 5 per cent off list
Upset set screws.....	80, 10 and 10 per cent off list
Milled studs.....	75 per cent off list

Semi-Finished Steel, f.o.b. Pittsburgh or Youngstown, per gross ton

Rolling billets, 4-in. and over.....	\$23.50 to \$25.00
Forging billets, ordinary.....	40.00
Forging billets, guaranteed.....	45.00
Sheet bars.....	35.00
Slabs.....	\$33.50 to 35.00
*Wire rods, common soft, base, No. 5 to ¾-in.....	45.00
Wire rods, common soft, coarser than ¾-in.....	\$2.50 over base
Wire rods, screw stock.....	\$5.00 per ton over base
Wire rods, carbon 0.20 to 0.40.....	3.00 per ton over base
Wire rods, carbon 0.41 to 0.55.....	5.00 per ton over base
Wire rods, carbon 0.56 to 0.75.....	7.50 per ton over base
Wire rods, carbon over 0.75.....	10.00 per ton over base
Wire rods, acid.....	15.00 per ton over base
Skelp, grooved, per lb.....	1.90c.
Skelp, sheared, per lb.....	1.90c.
Skelp, universal, per lb.....	1.90c.

*Chicago mill base is \$46. Cleveland mill base, \$45.

Alloy Steel

(F.o.b. Pittsburgh or mill)

S. A. E.	Series	Bars
Numbers		100 lb.
2100*	(½% Nickel, 10 to 20 per cent Carbon)	\$3.00 to \$3.25
2300	(3% Nickel)	4.50 to 4.75
2500	(5% Nickel)	5.75 to 6.00
3100	(Nickel Chromium)	3.50 to 3.65
3200	(Nickel Chromium)	6.00 to 6.25
3300	(Nickel Chromium)	7.50 to 7.75
3400	(Nickel Chromium)	6.25 to 6.50
5100	(Chromium Steel)	3.25 to 3.50
5200*	(Chromium Steel)	7.50 to 8.00
6100	(Chromium Vanadium bars)	4.25 to 4.50
6100	(Chromium Vanadium spring steel)	4.00 to 4.25
9250	(Silicon Manganese spring steel)	3.25 to 3.50
Carbon Vanadium (0.45 to 0.55 Carbon, 0.15 Vanadium)		4.00 to 4.25
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chromium, 0.15 Vanadium)		4.50
Chromium Molybdenum bars (0.80—1.10 Chromium, 0.25—0.40 Molybdenum)		4.25
Chromium Molybdenum bars (0.50—0.70 Chromium, 0.15—0.25 Molybdenum)		3.50 to 3.75
Chromium Molybdenum spring steel (1—1.25 Chromium, 0.30—0.50 Molybdenum)		4.75 to 5.00

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10-in. the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4-in. down to and including 2½-in. squares, the price is \$5 a gross ton above the 4 x 4 billet price.

*Not S. A. E. specifications, but numbered by manufacturers to conform to S. A. E. system.

PERSONAL

Harry F. Wahr, who has been elected president Mesta Machine Co., Pittsburgh, as announced in THE IRON AGE last week, was born in Pittsburgh in 1884



HARRY F. WAHR

and received his education in the Knox Public School, the Park Institute and the Western University of Pennsylvania, now the University of Pittsburgh, and was graduated from the latter with the degree of mechanical engineer, in 1903. Soon afterward he became associated with the Mesta Machine Co., for a number of years in the engineering and metallurgical departments, later becoming secretary and sales manager. When Frederick E. Mesta succeeded his brother as president, Mr. Wahr was made vice-president. His long association with the company has well fitted him to assume the position of chief executive and the business policies of this company.

H. D. Westfall, who resigned as general manager of sales, Wheeling Steel Corporation, as of Sept. 1, has become affiliated with the Weirton Steel Co., Weirton, W. Va., as assistant to E. T. Weir, president of the company. Mr. Westfall was identified with the Wheeling Steel Corporation and its predecessors for 22 years and before was with the American Sheet Steel Co., in New York, following a connection as assistant manager of sales with the New Philadelphia Iron & Steel Co., New Philadelphia, Ohio, which was absorbed by the American Sheet Steel Co. in 1900, and whose plant is now the New Philadelphia Works of the American Sheet & Tin Plate Co.

J. Leonard Replogle recently returned to New York from a stay of several months in Europe.

D. S. Bright, who has been manager of the Cleveland sales office of the Concrete Steel Co., New York, has been appointed manager of the company's combined Pittsburgh and Cleveland territories and his office will be transferred from Cleveland to 947 Union Trust Building, Pittsburgh, on Oct. 1. J. W. Peoples, who has been manager of the company's Pittsburgh office, has resigned and will engage in business in Florida but will retain a connection with the Concrete Steel Co. as its agent in West Palm Beach, where he will be located.

Guy E. Lown, purchasing agent of the Massey-Harris Harvester Co., Batavia, N. Y., has been elected a director and treasurer to succeed the late Edward C. Atwater. He will continue also to have charge of purchasing. Mr. Lown has been with the company 27 years.

William E. Muntz has been awarded a research fellowship at Carnegie Institute of Technology, Pittsburgh, in connection with the United States Bureau of Mines investigation into the relation between fusibility of coal ash and the formation of clinker in the coal when burned. The work will be under the direction of P. Nicholls, of the Bureau of Mines.

S. Horace Disston, vice-president in charge of sales of Henry Disston & Sons, Inc., Philadelphia, addressed the Purchasing Agents' Association of Pittsburgh at its regular meeting Sept. 15 and exhibited a three-reel motion picture showing how Disston products are made. Operations were shown from the pouring of the special steels to polishing and inspecting the finished products.

James B. Armstrong, who for some time was in the New York sales office of the Bethlehem Steel Corporation handling drop forgings and pig iron, and who recently was pig iron salesman for Henry H. Adams & Co., New York, has been appointed New York district sales agent for the Lebanon Drop Forge Co. and the Lebanon Steel Foundry, both of Lebanon, Pa. He has opened an office at 303 Fifth Avenue, New York.

George B. Troxell, research engineer with the Bethlehem Steel Co., Bethlehem, Pa., has just returned from an extended trip abroad. While in Europe Mr. Troxell visited steel plants in France, Belgium, Germany and England.

Charles F. Rand, who has been abroad since June, spending much of the time in Germany and Great Britain, arrived in New York last week.

Jesse L. Jones, since 1903 in charge of the chemical and experimental laboratory, Westinghouse Electric & Mfg. Co., has been named a director of the American Foundrymen's Association and also has been appointed chairman of the gray-iron castings committee. Mr. Jones is a former president of the Institute of Metals Division of the American Institute of Mining and Metallurgical Engineers, a member of the executive committee on molding sand research of the American Foundrymen's Association and National Research Council, of various committees of the American Society for Testing Materials and of the advisory committee on non-ferrous alloys of the Bureau of Standards.

E. S. Jenison, formerly sales manager of the Goulds Mfg. Co., Seneca Falls, N. Y., has become associated with the Smith-Booth-Usher Co., machinery jobber, as vice-president and resident partner in San Francisco. He is a graduate of the University of Michigan in mechanical engineering, and has had 16 years' experience in the East. Mr. Jenison was connected with the Goulds firm for 10 years as manager of its Philadelphia branch and as general sales manager.

A. A. Siereveld, employment manager Newport Rolling Mill Co., Newport, Ky., has resigned. He was the guest of honor at a luncheon on Sept. 18, attended by 40 superintendents and foremen at which he was presented with a watch. A. K. Andrew, president of the company, made the presentation. Mr. Siereveld will become associated with the personnel department of the Procter & Gamble Co. He will be succeeded by Ray Nattenheimer, who was formerly with the Babson organization and more recently has been Mr. Siereveld's assistant.

Earl Seale has been appointed secretary and assistant treasurer of the Domhoff & Joyce Co., Cincinnati, to succeed Clarence Hayward, recently resigned. Mr. Seale has been associated with the company for 13 years.

George K. Howland, who has been associated for some time with the Remington-Noiseless Typewriter Co., Middletown, Conn., has been made superintendent.

R. R. Clarke, superintendent of alloys foundry for the General Electric Co., Erie, Pa., was the speaker at the monthly meeting and dinner of the Pittsburgh Foundrymen's Association held at the Fort Pitt Hotel, Pittsburgh, Monday evening, Sept. 21. His subject was "The Foundry Physicist."

M. L. Murray, who has been engaged in the wire business for the past 36 years, has resigned his position as secretary-treasurer and general manager of the Alloy Metal Wire Co., Moore, Pa.

L. P. Ross, vice-president Replogle Steel Co., Wharton, N. J., returned from Europe last week. He had been abroad since early July and visited a number of iron and steel works centers in England and on the Continent.

Charles W. Moffett has resigned as vice-president of the Warren Gear Products Corporation, Warren, Pa., to become general manager of the Barney Auto Parts Co., New York.

William T. Mossman, director of publicity for the Jones & Laughlin Steel Corporation, has moved his offices from the Oliver Building to 311 Ross Street, Pittsburgh.

W. D. Sayle, president Cleveland Punch & Shear Works Co., Cleveland, returned last week from an extended European trip.

E. A. Whitworth has resigned as general superintendent of the Upson plant of the Bourne-Fuller Co., Cleveland, and has become associated with the Gathmann Engineering Co., Baltimore, manufacturer of ingot molds. His headquarters will be in Cleveland.

James A. Gardner has been appointed general sales manager of the Art Metal Construction Co., Jamestown, N. Y., manufacturer of office, bank and vault furniture and equipment, succeeding the late Joseph D. Rogers.

John McConnell, recently vice-president in charge of operations of the United Alloy Steel Corporation, Canton, Ohio, has joined the Donner Steel Co., Buffalo, in a consulting and advisory capacity.

L. R. Knapp, who for 18 years was associated with Takata & Co., 150 Broadway, New York, Japanese exporters and importers, has been appointed American representative of Ikeda & Co., Tokio, Japan, engineers and contractors. He has opened an office at 7 Dey Street, New York. The firm he now represents will import steel, electrical and mechanical machinery, chemicals and other American products into Japan, this being the same line of work in which Mr. Knapp has been engaged.

Otto Wuschack, director of the Metal-Industry Schoenebeck, at Schoenebeck near Magdeburg, and Rudolf Mundlos, director of Mundlos A.-G., at Magdeburg, both sewing machine manufacturers, are at present staying at the Plaza Hotel, New York, where they expect to remain until Oct. 1.

V. Horton, for many years manager of the New York office of the Perry, Buxton, Doane Co., Philadelphia, scrap iron and steel, has resigned, and the office is now in charge of George B. Doane, Jr.

Percival Johnson, president Pulaski Iron Co., Real Estate Trust Building, Philadelphia, has returned from a two months' trip in England and Scotland.

Charles Hart, president Delaware River Steel Co., Chester, Pa., has returned from a European trip.

A. H. Loranger, sales representative Republic Iron & Steel Co. at Chicago, has been transferred to the Cleveland sales office.

The Royal Typewriter Co., Hartford, Conn., is producing more typewriters for domestic and foreign trade than ever before in its history. Recently the company took on an additional 200 employees, and will hire 100 more shortly.

OBITUARY

EDWARD PERKINS SELDEN, who died in Erie, Pa., Sept. 11, was formerly president of the Erie City Iron Works. He was a native of Erie County, born there in 1858, and at the time of his retirement in 1923 had spent 50 years with the Erie City Iron Works. Mr. Selden was one of the pioneers in patenting and manufacturing some of the improved types of boilers now in use, and was well known to the steel trade. He had been prominent for many years in State and local Y. M. C. A. work and was a leader in philanthropic movements.

GEORGE W. PEMCILLE, aged 78 years, president and general manager of the Pemcille Pump Co., Lockport, N. Y., died at his home in that city Sept. 12, following a stroke of paralysis.

HENRY ROSE, for the past 10 years sales agent for the American Steel & Wire Co. in Philadelphia, died suddenly Sept. 17, in the Jefferson Hospital of that city, of complications resulting from a throat operation. Mr. Rose was a native of New York and had been in the service of the Steel Corporation and its predecessors for 41 years, starting with the Washburn & Moen Mfg. Co.'s New York sales division in May, 1884, when he was not quite 13 years old. He was a member of the Manufacturers' Club and the Steel Club of Philadelphia. He is survived by his wife and three children.

EDWARD R. C. WITTE, vice-president Miller Range & Furnace Co., Cincinnati, died in a Cincinnati hospital on Sept. 18, following an operation for appendicitis. Mr. Witte, who was 71 years of age, had been associated with the company for 50 years. He is survived by two sons.

GEORGE W. DEAN, superintendent Hyde Windlass Co., Bath, Me., died Sept. 17 at his home in that city in his seventieth year. Mr. Dean was associated with the Windlass company for 40 years. At the time of his death he was mayor of Bath.

JAMES DEERING, formerly vice-president of the International Harvester Co., died Sept. 1, aboard the steamship Paris, en route from Europe. He was born in Maine in 1859 and was educated at Northwestern University and Massachusetts Institute of Technology. Until 1902, he was an officer in the Deering Harvester Co., which merged with other interests to form the International Harvester Co., of which he became vice-president. Later he was president of the International Harvester Co. of New Jersey. In recent years Mr. Deering lived in Miami, Fla., having retired from business.

Scrap Weakens as Shipments Are Held Up

DETROIT, Sept. 22.—With several of the large consumers of waste material in Ohio holding up on shipments, prices on blast furnace scrap have shown some further declines and there is a general tone of weakness in the market. While production of all grades of waste material in the district is high, very little has been stocked by dealers and current orders apparently are giving an outlet to this tonnage.

The following prices are quoted on a gross ton basis f.o.b. producers' yards, excepting stove plate, No. 1 machinery cast and automobile cast, which are quoted on a net ton basis:

Heavy melting and shoveling steel	\$14.25 to \$14.75
Borings and short turnings	11.25 to 11.75
Long turnings	10.00 to 10.50
No. 1 machinery cast	15.00 to 16.00
Automobile cast	21.00 to 22.00
Hydraulic compressed	13.25 to 13.75
Stove plate	12.50 to 13.00
No. 1 busheling	12.75 to 13.25
Sheet clippings	9.00 to 10.00
Flashings	12.00 to 12.50

Foundrymen to Meet at Syracuse

(Continued from page 821)

Simpson, president and manager; B. Castor, master mechanic; W. J. Bell, engineer; H. N. Schreuder, New York representative; C. J. Skeffington, Detroit representative; W. C. Edgar, Pittsburgh representative; C. D. Hollins, sales manager.

NEW HAVEN SAND BLAST CO., New Haven, Conn. Booths 158, 160. Model DP direct pressure sand blast barrel. Represented by Donald S. Sammis, George C. Fatscher, S. S. Parsons and William R. Matteson.

NEW YORK & PENNSYLVANIA CLAY PRODUCTS CO., Rochester, N. Y. Booth 282. Revivo bond for use in reviving of molding and core sand. Represented by S. M. Neff, R. L. Cleland, S. H. Cleland, R. L. Pinkley, E. G. Stallman.

WILLIAM H. NICHOLLS CO., Brooklyn. Booths 66 to 74, 149 to 157. Jolt squeezer with pattern drawer and automatic flask discharger; also demonstration of the handling of sand, flasks and molds by conveyor system. Represented by William H. Nicholls, president.

NORMA-HOFFMANN BEARINGS CORPORATION, Stamford, Conn. Booth 401. Norma precision ball bearings of both open and closed types; Norma and Hoffmann ball thrust bearings; Hoffmann precision roller bearings in all forms; Hoffmann precision rollers and the Norma mini-meter; several operating models and applications. Represented by O. P. Wilson, vice-president; George R. Bott, engineering manager; Norman Bell, assistant sales manager; C. H. Wallace, Fred W. Mesinger.

NORTON CO., Worcester, Mass. Booths 18, 20, 22. Three sizes of electrically driven floor stands; grinding wheels of various types; Alundum and Crystolon refractories; Norton floors consisting of floors, stair tiles and treads. Represented by Charles H. Baker, Jr., F. W. Elya, Herbert Duckworth, F. H. Stenberg.

O

S. OBERMAYER CO., Chicago. Booths 196 to 204. Foundry material, ladle lining, refractories, black plastic blacking and other specialties. Represented by Theodore Kauffman, president; S. T. Johnston, vice-president; E. D. Frohman, vice-president; J. L. Cummings, manager refractory division.

OILLESS CORE BINDER CO., Cleveland. Booth 346. Oilless core binder; test blocks showing severe tests made; intricate steel and gray iron castings; cores. Represented by H. A. Boker, secretary-treasurer; J. A. Hamilton, vice-president; H. B. Fischer, sales manager.

GEORGE OLDHAM & SON CO., Baltimore. Booth 156. Pneumatic chipping hammers, foundry rammers, scalers, riveters. Represented by R. W. Nelson, sales manager; N. A. Pelham, Buffalo representative.

OLIVER MACHINERY CO., Grand Rapids, Mich. Booths 6, 7. No. 75 pattern milling machine; No. 80-D motor arbor saw bench; No. 193 portable saw bench; No. 192 18-in. band saw; No. 166-C 16-in. motor-on-arbor jointer; No. 133-B 6-in. portable jointer; No. 199-E surfacer with knife grinding attachment; No. 51-E speed lathe with turning tools; No. 34-D 30-in. disk and spindle sander with self-contained motor drive; No. 182 15-in. disk sander; No. 72-D motor arbor borer; No. 9-B wood trimmer; No. 585 grinder; No. 128 pattern makers' bench, and No. 462 electric band saw brazer.

OSBORN MFG. CO., Cleveland. Booths 227 to 233. Modern and improved types of power-operated molding machines, including the following styles: No. 275 jolt squeezer machine, No. 322 jolt roll over squeeze pattern draw machine, No. 401 jolt roll over pattern draw machine, No. 147 roll over air-operated pattern draw machine, No. 177 jolt squeeze stripper machine, No. 549 jolt stripper machine and No. 75-J jolt squeeze machine. Represented by F. G. Smith, president; E. S. Carman, secretary and chief engineer; M. W. Zeman, sales manager machine division; E. T. Doddridge, J. C. Alberts, F. T. Spikerman, R. E. Kiefer, H. B. Klar, J. D. Wise, sales engineers; R. W. Hisey, assistant works manager; E. F. Oyster, mechanical engineer; G. A. Sawitzke, superintendent machine shop; Ward Dougherty, service engineer; J. F. Howard, service engineer.

OXWELD ACETYLENE CO., New York. Booths 409, 410. Complete line of Oxweld apparatus and supplies for oxy-acetylene welding and cutting, together with Linde oxygen, Prest-O-Lite acetylene and Union carbide; featuring the new Oxweld 35-lb. portable low pressure generator, a device for generating acetylene from cal-

cium carbide and water. Represented by J. W. Dunn, publicity department; G. R. Mitchell and C. H. Mitchell of Oxweld Acetylene Co.; J. R. Hughes and A. R. Herson of the Linde Air Products Co.

P

PANGBORN CORPORATION, Hagerstown, Md. Booths 116 to 126 and 201 to 211. A complete direct motor driven clear vision table-room, with dust arrester and exhauster overmounted on the room; also a new Loads Quick sand blast barrel, designed for quantity production, with integral direct motor drive for both barrel and elevator (both pieces of equipment are designed for use of sand or steel abrasive, without change or adjustment); demonstration of the barrel loading device. Represented by Thomas W. Pangborn, president; John C. Pangborn, vice-president; H. D. Gates, sales manager; P. J. Potter, works manager; Foster J. Hull, mechanical engineer; George A. Cooley, district sales engineer, Springfield, Mass.; Jesse J. Bowen, district sales engineer, Rochester, N. Y.; W. T. Randall, district sales engineer, Philadelphia; Charles T. Bird, district sales engineer, Detroit; W. C. Lytle, district sales engineer, Chicago.

PATENT CEREALS CO., Geneva, N. Y. Booth 100. Rex core and facing binder; cores, etc., made with Rex. Represented by T. K. Fahy, assistant sales manager; A. N. Duncan, foundry expert.

J. W. PAXSON CO., Philadelphia. Booths 176, 178. Sand blast machinery. Represented by H. M. Bougher, president; Ira Kremer, sales engineer; Harry Titgen, sales engineer; C. B. Somers, sales engineer; George F. Crivel, sales engineer.

CHARLES PETTINOS, New York. Booths 106, 108. Full line of molding and foundry sands, clays, cupola daubs, etc.; plumbago, graphite, foundry facings, blackings, etc. Represented by Marshall Houskeeper, sales manager; Walter J. Meighan, metropolitan representative; J. Howard Bing, eastern Pennsylvania representative; William T. Bennett, New England representative; James J. Grace, special representative.

GEORGE F. PETTINOS, Philadelphia. Booth 383. Represented by George F. Pettinos, Robert M. Bird, Anna M. Kunkle, James Hatten, Donald S. Yeomans, E. G. Stratten, George A. Doughten.

PICKANDS, BROWN & CO., Chicago. Booth 393. Milwaukee and Chicago Solvay foundry coke. Represented by G. A. T. Long, foundry expert; C. M. Pearson, assistant foundry expert.

PITTSBURGH CRUSHED STEEL CO., Pittsburgh. Booths 228, 230. Steel abrasives for use in sand blast machines such as Angular steel grit and Samson steel shot; a Pangborn sand blast barrel and a Sly sand blast cabinet in operation, using steel abrasives; quantities of all sizes of both steel shot and steel grit on hand to demonstrate various finishes on all kinds of castings. Represented by C. H. Kann, president; H. M. Ream, sales manager.

PITTSBURGH ELECTRIC FURNACE CORPORATION, Pittsburgh. Booths 73, 75, 77. Small furnace producing castings. Represented by H. E. Bromer, assistant sales manager; W. H. Payne, service engineer; O. J. Abell, Chicago office; Presley Hamilton, New York office; Alexander Haigh, Boston office; W. E. Moore, consulting engineer; G. L. Simpson, electrical engineer; W. B. Wallis, president; R. D. Thomas, Philadelphia office.

PORCELAIN ENAMEL & MFG. CO., Baltimore. Booth 362. Finishes in various enamels. Represented by Karl Turk, vice-president; Frank G. Roberts, assistant to vice-president; Herbert Turk; Paul Klaesius; Albert Kregel, engineer.

PORTAGE SILICA CO., Youngstown. Booth 104. Portage steel molding, core and sand blast sands; also Portage Silica rock in its natural state. Represented by E. E. Klooz, vice-president and general manager; Leo R. Farrell, secretary and sales manager; C. F. Eberhart, chief clerk.

PORTER-CABLE MACHINE CO., Syracuse, N. Y. Booths 263, 264. Tool room lathe, production lathe, pattern shop sanders, grinders, band saws, vertical milling attachments. Represented by A. N. Emmons, engineer; D. J. Ridings, sales manager.

BERNARD H. PRACK, Pittsburgh. Booth 280. Pictures of foundries and manufacturing buildings designed and constructed by this organization. Represented by Bernard H. Prack, A. E. Prack, Fred Prack, W. G. Prack, W. L. Miller, B. D. Fuller.

HENRY E. PRIDMORE, Chicago. Core machine; 24-8 in. draw combination air jolt power rockover foot draw machine; 14-in. combination jolt squeezer and power

stripping plate machine. Represented by Mrs. E. M. Pridmore, president; Henry A. Pridmore, vice-president; F. W. Hamel, sales manager; Marshall E. Pridmore, assistant sales manager; Earl B. Pridmore, engineer; H. F. Burggraf, plant manager; Edgar F. Tierney, salesman.

R

RIVETT LATHE & GRINDER CORPORATION, Boston. Booth 266. New style Rivett No. 104 internal grinder, motor driven; Rivett No. 608 back geared precision lathe with standard equipment and attachments. Represented by E. P. MacCannell, H. L. Hathorne, H. E. Baker.

ROBESON PROCESS CO., New York. Booths 352, 353. Core binders, glutrin, goulac and encore. Represented by Gordon I. Lindsay, president; B. W. Bullen, assistant treasurer; T. J. Ryan, T. J. O'Hara and J. A. Smith, salesmen.

ROHRBACHER SHOE CO., Boston. Booth 347. Rohrbacher's Artisan shoes; advanced types for all foundry uses. Represented by F. H. Rohrbacher, A. L. Rohrbacher, Jr.

ROLLWAY BEARING CO., Syracuse, N. Y. Booth 247. Rollway maximum type precision bearings; Rollway wide series bearings; Rollway utility bearings; Rollway precision thrust bearings; Rollway housings for use in motors, rolling tables, cranes of various types, conveyors, car dumpers, etc. Represented by E. J. Lybert, district manager, Philadelphia; S. M. Farrell, district manager, Youngstown; S. J. Kalsner, district manager, Chicago; J. H. Evans, designing engineer; F. H. Buhlman, designing engineer; J. T. R. Bell, treasurer and general manager.

R. H. & F. M. ROOTS CO., Connersville, Ind. Booth 285. Represented by E. D. Johnston, general manager; H. M. Papworth, district manager, New York office; L. A. Snyder, service engineer.

ROSS-TACONY CRUCIBLE CO., Tacony, Philadelphia. Booth 345. Graphite crucibles, stopper heads, nozzles and special shapes. Represented by William C. Yenger, Eastern representative; Charles Orne, Jr., Western representative; I. R. Robinson, Western representative; Charles C. Bacon, secretary.

ROYER FOUNDRY & MACHINE CO., Wilkes-Barre, Pa. Booths 67, 69, 71. Royer sand separators and blenders, portable and stationary. Represented by G. F. Royer, president; John Lloyd, vice-president; Alexander Haigh, sales representative; David D. Baxter.

RUEMELIN MFG. CO., Minneapolis. Booth 53. Ruemelin square sand blast cabinets with plain and revolving tables, sanitary sand blast curtains, rapid production sand blast machines, Ruemelin sand blast generators, guns, sand sifters, exhaust fans, etc. Represented by Richard Ruemelin, president; C. H. Scholer.

S

SAFETY EMERY WHEEL CO., Springfield, Ohio. Booth 19. Ball bearing motor floor and portable grinders; safety collars and safety hoods; grinding wheels and abrasive specialties. Represented by Robert K. Noble, W. H. Vance and Harry G. Bennett, representatives; Herman G. Weinland, mechanical engineer.

SAFETY EQUIPMENT SERVICE CO., Cleveland. Booth 373. General line of safety equipment including industrial goggles, respirators, gas masks, fireproof leggings, asbestos clothing and gloves, fireproofed clothing, signs and a complete line of material for prevention of accidents. Represented by H. L. Wood, D. E. Kimball, B. W. Nutt.

SEMET-SOLVAY CO., Detroit. Booth 399. Metallurgical coke. Represented by P. K. Malin, president; J. H. Whites, assistant to president; J. W. Shaeffer, vice-president; J. A. Ballard, sales manager; Samuel Weiss, district representative; R. H. Watson, metallurgist; W. W. Stevenson, general superintendent.

SHEPARD ELECTRIC CRANE & HOIST CO., Montour Falls, N. Y. Booths 109, 111, 113. Shepard electric cupola charger arranged for cage control; Shepard electric cupola charger arranged for floor control; drop bottom charging buckets for pig, scrap and coke; patented umbrella type bucket for charging pig and scrap; Shepard electric Liftabout; Shepard speed reducer; also gearing and other parts of hoists. Represented by F. A. Hatch, vice-president and general manager; R. H. McGredy, secretary and sales manager; R. T. Turner, specialist on foundry application; G. L. Drake, sales engineer; H. D. Crout, erecting engineer.

SIMONS PAINT SPRAY BRUSH CO., Dayton, Ohio. Booth 349. Paint spray brush equipment and portable air compressors for painting wood, metal, concrete or stucco surfaces that should be covered with paint. Represented by George W. Simons, president.

SKEPPSTEDT-ERICKSON CO., Moline, Ill. Booth 147. Type "A" and type "B" Skeppstedt multiple core machines in operation; Skeppstedt adjustable core bench; sample castings showing the possibility of coring castings to size, and sample cores. Represented by Olof Skeppstedt and E. G. Erickson, owners.

SKYBRYTE CO., Cleveland. Booth 351. A method for cleaning foundry glass will be demonstrated. Represented by V. L. Loventhal, vice-president; T. T. Holt, president.

W. W. SLY MFG. CO., Cleveland. Booths 134 to 148, 219 to 225. No. 00 positive pressure Slyblast mill with tilted barrel; No. 2 positive pressure Slyblast mill; No. 4 Universal Slyblast mill; Slyblast machine; turntable cabinet complete with accessories; Slyblast room arranged for demonstration of the downdraft system of ventilation; square tumbling mill with combination clutch and brake; Model Sly dust arrester; an operating exhibit for demonstrating pneumatic reclamation of steel molding sand. Represented by S. C. Vesay, president; G. A. Boesger, chief engineer; F. A. Ebeling, sales manager; C. P. Guion, D. P. Carter, M. T. Mortensen, L. B. Brewster, D. L. Harris, H. C. Nicholas, R. O. Mullen, W. L. Kammerer and R. W. Hasselle, sales engineers.

WERNER G. SMITH CO., Cleveland. Booth 388. Linoll and other core oils; specimen cores made with same. Represented by Werner G. Smith, president; Milton S. Finley, vice-president; N. A. Boyle, treasurer; Wallace Alexander, chief chemist; I. M. Gertels, sales department; William Rayel, service expert; Louis F. Ferster, advertising manager; L. P. Robinson, New England manager; Frank Dodge, Detroit manager; George Graham, Philadelphia representative; Thomas Procter, Chicago manager; M. M. Werckman, Dayton, Ohio, representative; E. H. Heartlein, Moline, Ill., representative; John M. Glass, Indianapolis representative.

SPEEDNUT SALES & SERVICE CO., New York. Booth 287.

SPENCER TURBINE CO., Hartford, Conn. Booth 139. Spencer turbo compressors supplying air for foundry cupolas, brass melting furnaces, etc. Represented by S. E. Phillips, secretary; H. M. Grossman, sales engineer; O. J. Dingee, W. G. Cross.

STANDARD SILICA CO., Chicago. Booth 376. Silica, foundry and abrasive sands, featuring the company's special line of Blackhawk brand silica. Represented by A. C. Goodnow, vice-president; F. D. Chadwick, plant manager; R. W. McCandlish, sales manager.

STERLING WHEELBARROW CO., Milwaukee. Booths 189, 191. Rolled steel foundry flasks, special foundry wheelbarrow, truck parts, foundry specialties. Represented by H. H. Baker, secretary; J. J. Coyne, Chicago branch manager; J. M. Dickson, Cleveland branch manager; G. H. Lambkin, New York branch manager; O. E. Stey, St. Louis branch manager; H. J. Felsburg, Philadelphia branch manager; L. P. Robinson, Boston branch manager; R. F. Jordan, assistant sales director.

FREDERIC B. STEVENS, Detroit. Booth 105.

STONE FOUNDRY ENGINEERING & EQUIPMENT CO., Cleveland. Booths 143, 145. Stoney high speed molding machine; shakeout balls of various descriptions; vibrators; core knockout machine. Represented by John T. Stoney, president; E. S. Cohen, chief engineer; L. J. Reinhard, sales manager; Joe Soukop, superintendent.

SULLIVAN MACHINERY CO., Chicago. Booths 47, 49. Sullivan WN-31 angle compound air compressor, 600 cu. ft. capacity, operated by direct connected General Electric type P. S. synchronous motor; WG-6 10 x 10 single stage air compressor, idle; Sullivan turbobair portable compressed air hoist; Sullivan compressed air core busters. Represented by Louis R. Chadwick, manager, New York office; C. G. Cummings, sales representative, Syracuse, N. Y.; R. B. Hosken, Chicago general sales manager; O. R. Cundy, Pittsburgh office; H. V. Sturtevant, Cleveland office; Robert Moth, in charge of exhibit from Michigan City plant.

SWARTWOUT CO., Cleveland. Booth 36. Swartwout ovens, Swartwout ventilators and Swartwout separators. Represented by Carl P. Mayer, chief engineer; George H. Thomson, sales manager.

WILLIAM SWINDELL & BROTHERS, Pittsburgh. Booths 21, 23. 1000-lb. electric melting furnace. Represented by E. H. Swindell, treasurer; R. W. Porter, vice-president; W. H. Cosgrove, chief engineer; F. W. Brooke, chief engineer electric furnace department; G. P. Mills, sales engineer; F. H. Graham, sales engineer.

SYRACUSE SUPPLY CO., Syracuse, N. Y. Booths 267 to 279. Lathe, shaper and radial drills (American Tool Works Co., Cincinnati); 26-in. Libbey lathe (International Machine Tool Co., Indianapolis); disk grinders (Gardner

Machine Co., Beloit, Wis.); ball bearing sensitive drill presses (Edlund Machinery Co., Cortland, N. Y.); lathes (Monarch Machine Tool Co., Sidney, Ohio); core wire straightening machine (Kane & Roach Co., Syracuse, N. Y.); milling machine (Kearney & Trecker Corporation, Milwaukee); screw machine and turret lathe (Foster Machine Co., Elkhart, Ind.). Represented by F. L. Stuebenroth, H. W. Schatz, F. H. Robertson, J. Edlund, J. C. Raterman, H. E. Kane, E. J. Gale, C. Reasel, G. W. Mulliner, F. B. Scott, Jr., W. H. Birdsall, H. D. Mozeen, O. T. Sarber, W. E. Whipp, M. Schmitt, W. L. Townsend, J. C. Hussey.

T

TABOR MFG. CO., Philadelphia. Booths 55, 57, 59. Complete line of foundry molding machines. Represented by H. W. Brown, secretary; J. T. Ramsden, chief engineer; P. J. Shire, field inspector; T. L. Sumner, demonstrator; William E. Sewell and James H. Coleman, salesmen.

TIONA PETROLEUM CO., Philadelphia. Booth 344. Tiona products including Tiona Koroll, Tiona Chekrust and Tiona cutting oils. Represented by W. H. Bassett, sales manager of Koroll division; George B. Kerr and T. Raymond Adams.

TRANSMISSION BALL BEARING CO., Buffalo. Booth 190. Complete line of Chapman ball bearings for power transmission and machine applications in several forms, both standard and special pillow blocks; swing frame grinder equipped with motor and with Chapman dumb-bell type dust-proof bearings. Represented by C. M. Murray, president; T. H. Kilgore, manager; R. L. Schuyler, plant superintendent; E. Hambleton, chief engineer; B. C. Brown, special sales representative; H. G. Barnes of Barnes Tool & Transmission Co.

TRUSCON STEEL CO., Youngstown. Booths 255, 257, 259. Truscon alloy steel flasks, snap flask bands, bottom boards; Truscon alloy steel platforms, core plates; Truscon alloy steel boxes, core racks, steel building products. Represented by G. F. Sparks, general manager, pressed steel department; John Fielding, manager, Syracuse branch; H. W. Jencks, Detroit; J. C. Peirce, Chicago; G. E. Madden, Pittsburgh; A. L. Abrahams, New York; L. S. Todd, Cleveland; G. W. Williams, Syracuse; C. H. Watt, Boston; N. C. Ferreri, Youngstown; P. A. Nuttall, Youngstown; W. H. Price, Youngstown.

E. ARTHUR TUTEIN, INC., New York, Boston and Philadelphia. Booths 415, 417. Foundry, malleable, forge and basic pig iron; furnace, foundry and domestic coke; iron ore, ferromanganese and other alloys; coal tar products, such as benzol, sulphate of ammonia, etc. This company is selling representative of the Hudson Valley Coke & Products Corporation, Troy, N. Y., whose by-product coke plant and blast furnace will be shipping shortly. Represented by E. Arthur Tutein, president; Dexter A. Tutein, vice-president and manager of New York office; Hubert A. White, secretary and manager Boston office; F. E. Townley, manager Troy office; Theodore C. Wilson, salesman Boston office; A. D. Darragh, salesman New York office; H. E. Yeager and Gilbert S. Sank, salesmen, Philadelphia office.

U

UNITED COMPOUND CO., Buffalo. Booth 356. Buffalo brand vent wax and Buffalo brand pattern wax. Represented by L. F. Leney, manager; W. F. Bradley, treasurer.

UNITED STATES GRAPHITE CO., Saginaw, Mich. Booths 363, 364. Mexican plumbago, core wash, USG motor and generator brushes. Represented by George D. Robinson, Buffalo sales manager; R. J. Edmiston, Pittsburgh; A. G. Greene, Cincinnati.

UNITED STATES SILICA CO., Chicago. Booth 114. Flint Shot sand blast abrasive and samples of the cleaning work done by Flint shot, lent company by customers. Bacharach flow meter set up as a demonstration of how it is connected to sand blast equipment, together with fittings and blue prints showing how it is connected to air lines of various sizes. Represented by Volney Foster, president; H. F. Goebig, vice-president and secretary; O. M. Oisen, field representative; R. R. Shuman, advertising counselor; W. Kent.

W

WADSWORTH CORE MACHINE & EQUIPMENT CO., Akron, Ohio. Booth 354. Wadsworth core making machines, Wadsworth core cutting off and coning machines, Wadsworth all-steel reinforced core trays and bottom plates. Represented by M. C. Sammons, secretary; George H. Wadsworth, president and general manager.

WALDO, EGBERT & MCCLAIN, INC., Buffalo. Booth 355. Pig iron, coke, coal, sheet steel and fuel oil. Represented by Fred J. Waldo, president, Buffalo; Justus Egbert, vice-president, Buffalo; Loring G. Calkins, vice-president, Boston; Alfred F. Stengel, vice-president, Buffalo; Michael F. Selbert, assistant secretary, Buffalo; Fred E. Gross and Harry R. Defler, salesmen, Buffalo.

WARNER & SWASEY CO., Cleveland. Booths 127, 129. No. 1-A universal hollow hexagon turret lathe, first part of the week on a bar job (a typical shaft machined with standard bar equipment, including threading) and the latter part on a chucking job which will be a cast steel can used on can making machinery with standard chucking equipment; latest type of motor drive; Roto pneumatic grinder, type D-1 and type D-2, in operation. Represented by C. J. Stilwell, sales manager; A. H. Keetch, Buffalo manager; H. R. Ward, Syracuse district; J. A. Craig, demonstrator.

WATSON ENGINEERING CO., New York. Booth 348.

WILBUR WATSON & ASSOCIATES, New York. Booth 348. Booklets, pamphlets, circulars and photographs descriptive of the accomplishments of the firm. Represented by Stanley H. Chadwick and Charles D. Watson, partners.

WESTINGHOUSE AIR BRAKE CO., Wilmerding, Pa. Booths 15, 170. Westinghouse-National type 3VS-30, 315-cu. ft. piston displacement, 100-lb. pressure, motor driven air compressor, driven by 60-hp. 3-phase, 60-cycle, 220-volt a.c. motor, including type "HP" automatic control with electric lights installed under glass covers on side, top and rear, so that gear and pinion and crank shaft bearings may be observed during operation or when idle; Westinghouse enameled 42½ x 96 in. storage air reservoir, including drain cock, 5-in. air gage, safety valve, etc.; various types of air operating valves, suitable for both single and double acting cylinders, as well as standard air cutout cocks, air hose with fittings, etc. Represented by M. H. Burchard, vice-president, National Brake & Electric Co., Milwaukee and O. H. Miller, industrial representative, New York; S. A. King, Jr., industrial representative, Chicago; F. C. Young, representative, Pittsburgh; S. B. Schrentz, industrial representative, Pittsburgh; R. G. Justus, industrial representative, St. Louis; W. C. Burriess, inspector, Pittsburgh, of the Westinghouse Traction Brake Co.

WHITEHEAD BROTHERS CO., Buffalo. Booths 416, 417, 418, 419. Foundry sands, clays and gravels, foundry facing and supplies. Represented by A. J. Miller, J. H. Whitehead, V. L. Whitehead, Jr., C. E. Andrews, R. L. Carpenter, T. Hogan, A. Y. Gregory, F. B. Clarke, A. W. Jacus, H. S. Depew, A. McBride, H. B. Hanley.

WHITING CORPORATION, Harvey, Ill. Booths 181, 183. Display consisting largely of photographs, drawings and sales literature. Represented by J. H. Whiting, T. S. Hammond, R. H. Bourne, A. H. McDougall, J. S. Townsend, J. R. Bates, R. E. Prussing, W. R. Hans, R. S. Hammond, Don Reese, P. B. Crousse, A. J. Grindle of the Grindle Fuel Equipment Co.

G. H. WILLIAMS CO., Erie, Pa. Booth 96. Hook-on clam shell bucket for foundry use. Represented by P. T. Robin, assistant chief engineer; T. D. Harter, sales engineer; G. E. Monroe, sales department; A. J. Lichtinger, engineering department.

E. J. WOODISON CO., Detroit. Booths 150, 154. Represented by E. J. Woodison, A. W. Ferguson, G. A. Burman, W. J. Wark, F. F. Shortsleeve, W. M. Hill, Jr., O. E. Peterson, L. A. Dawson, A. E. Mead, R. H. Hoffman.

WORTHINGTON PUMP & MACHINERY CORPORATION, Cincinnati. Booth 35. A 350-cu. ft. Worthington feather valve air compressor, close belted from a 40-hp. general electric, slip ring type motor, Maxim silencer provided on the suction; also a core wire straightener and a sand rider. Represented by William J. Daly, sales engineer, Cincinnati; F. W. Hankins, New York representative; J. A. Bowers, Buffalo representative; C. C. Scott, manager Buffalo office.

YALE & TOWNE MFG. CO., Stamford, Conn. Booths 31, 33. Chain blocks and trolleys, electric hoists, overhead crane and electric industrial trucks of the storage battery type. Represented by C. H. Moeller, Pittsburgh; T. O. Warford, Rochester; R. E. Wilson, New York; J. C. Morgan, sales manager of material-handling equipment.

YOUNG BROTHERS CO., Detroit. Booths 216, 218. Test oven, samples of products baked in some of the company's installations; operating model showing a new type continuous conveyor compensating oven. Represented by T. P. McVicker, H. M. White, V. A. Fox, M. C. Murdoch, R. B. Reed, C. G. Lisch, P. A. Meyer, G. I. Thatcher.

Industrial News Notes

The Globe Vacuum Bottle Co., Newfield, N. J., has been organized with \$100,000 capital stock to manufacture vacuum bottles and lunch kits. It will purchase cans, cups, etc. Operations have been started and materials are being purchased. Frank R. Dougherty is president.

Hodecker Brothers, 176 Commerce Street, Newark, N. J., operating an electroplating plant, will continue as before the death of Henry Hodecker, one of the principals. William F. Hodecker and Edward Hodecker will be in charge.

The Plainfield Engineering Co., 704 South Avenue, Plainfield, N. J., recently incorporated, will do general contracting and machine repairing, specializing on tools and fixtures. John W. Mahan is president.

The Double Rotary Sprinkler Co., Coca Cola Building, Kansas City, Mo., has been incorporated to continue a business established five years in the manufacture of sprinklers. L. E. Holland is one of the principals.

The R-O-Matic Express Percolator Corporation, care of Guido M. Sacerdote, 1819 Broadway, New York, has been incorporated, but it is likely that manufacturing will be done by contract.

The De Bothezat Engineering Corporation, Canadian Pacific Building, 1922 Park Avenue, New York, recently incorporated, will manufacture disk fans and blowers, water and air propellers, quantity production being handled by the Seymour Products Co., Seymour, Conn. Albert E. André is general manager.

The Gould-Detroit Axle Co., 5626 McGraw Avenue, Detroit, incorporated with \$100,000 capital stock to manufacture a two-speed axle for automobiles, has completed manufacturing arrangements and will have its product ready for the market shortly.

The Ochrom Valve Co., Standard Oil Building, Baltimore, has been incorporated to manufacture poppet valves for internal combustion engines. The material used in the valves is Ochromite, a synthetic mixture of copper, nickel, manganese iron and chromium. Manufacturing will be done by contract by the Curtis Bay Copper & Iron Works. E. A. Ewing is general sales manager.

The Tiffany Adjustable Stand Co., 118 Morgan Street, St. Louis, has been incorporated with \$50,000 capital stock to manufacture adjustable stands for supporting small machines. It has a well-equipped factory and production has been started. Requirements include tubing and channel iron, screws, nuts, castors, etc. J. K. Hosterman is secretary-treasurer.

The Brownie Mfg. Co., 2921 Pennsylvania Street, Fort Wayne, Ind., is a continuation of the Illinois corporation by that name and manufactures hardware specialties, having recently completed a plant at Fort Wayne.

The Franklin Electric Co., 326-330 Pearl Street, Hartford, Conn., has been organized with capital stock of \$50,000 to act as wholesale distributor of electrical equipment. C. T. Hayden is treasurer of the company.

James H. Betts, Inc., 1391-95 Sedgwick Avenue, New York, has been incorporated to manufacture motor flashers, thermostatic flashers, traffic controllers, color caps and bell ringing transformers. Mr. Betts is president.

The Wayne Iron Works, 1087 Beaufault Street, Detroit, has been organized for fabricating and erecting structural steel and miscellaneous iron work for building construction. Its plant is equipped to handle about four hundred tons per month. L. A. Hopkins is manager.

The Badger Mixer Co. has been organized with \$250,000 capital stock as successor to the Badger Concrete Mixer Co. The company will resume manufacturing concrete mixers, initial operations to be conducted in the factory of the McVicker Railclamp Tieplate Co. Later the company will manufacture tilting mixers, completing its line from small mixers to street pavers. It is planned eventually for the company to locate in its own plant, and at that time it will be in the market for machinery. E. M. McVicker is one of the heads.

The Akron Tyrwelder Co., Akron, Ohio, has been incorporated as a division of the Akron Equipment Co., Akron, Ohio.

The Leland Truck Co., Tulsa, Okla., has been organized with warehouse and offices at 30 North Owasso Street to distribute truck tanks, hand holsts, trailers, air springs, etc. Harry R. Leland is president.

The Dayton Rolled Metal Co., Dayton, Ohio, has been incorporated for \$25,000 to manufacture rolled metal products. It has acquired a plant in the Davis factory community of Dayton and will move its equipment there from Chicago. H. M. Huffman is president.

The Poulsen & Nardon Tool & Die Works has moved to larger quarters at 1255 East Ninth Street, Los Angeles, to accommodate increased business.

The Electric Heating & Mfg. Co., Seattle, Wash., is now occupying its new plant on Sixth Avenue, North and Harrison Street. It manufactures electric heating devices and in its new building will have a much larger capacity.

The Water Works & Power Equipment Co., San Francisco, has opened offices in Room 4461, White-Henry-Stuart Building, Seattle. The company represents in Seattle and San Francisco: the Leadite Co., Philadelphia, Newport News Shipbuilding & Dry Dock Co., New York, Wellman-Seaver-Morgan Co., Cleveland, Simplex Valve & Meter Co., Philadelphia, and the Pittsburgh Valve, Foundry & Construction Co., Pittsburgh.

The George W. Korn Razor Mfg. Co., Little Valley, Cattaraugus County, New York, has filed a voluntary petition for a receiver in proceedings for the dissolution of the company. The petition states that for the past few years there has been a steady decline in the business. The company is solvent, but desires to discontinue business. It will be operated temporarily under the management of a receiver until unfilled orders are completed.

Products of the Lufkin Foundry & Machine Co. and the Coast Oil Fields Supply Co., Los Angeles, will be distributed in the California oil fields by the American Oil Well Engineering Co., a new \$200,000 corporation. John W. McAteer, New York, is president of the new concern, and I. C. Bouchard, general sales manager. Mr. Bouchard was in charge of the Lucey Co.'s Taft, Cal., branch for the past eight years.

The Harris Iron & Metal Co., Inc., 131 Water Street, New Haven, Conn., has been organized with \$50,000 capital stock to buy and sell new and old iron and metals, as successor to the iron and metal department of Botwinik Brothers, machinery dealers.

The Keystone Brake & Mfg. Co., 1214 Broad Street, Pittsburgh, recently incorporated, has been operating on a limited scale, making four wheel brakes for automobiles. Later it will move to larger quarters and extend its capacity.

The Goodman Electric Machinery Co., 126 Green Street, Newark, N. J., recently incorporated to manufacture and deal in machinery, will buy, sell and repair electric welders, lifting magnets and electric holsts. The company plans to add to its stock of used arc welders.

The Santiago Metal Corporation, Georgetown, Colo., has been organized with \$300,000 capital stock to operate lead, zinc and copper mines. J. R. Campbell is president.

The Newark Ladder & Bracket Mfg. Co., 317 Springfield Avenue, Newark, N. J., recently incorporated, is engaged in manufacturing the lines indicated.

The S. G. Engineering Co. has been organized as a subsidiary of Copeland Products, Inc., manufacturer of refrigerating systems.

The Ruggles Metal Products Co., 1415 Ionia Avenue, E. W., Grand Rapids, Mich., has been organized to continue the business of the Brummeler-Ruggles Metal Products Co. It will continue to manufacture motor trucks. A. R. Ruggles is president and treasurer.

The Steam Specialty Co., 2025-27 Avenue B, Galveston, Tex., has been incorporated as distributor of specialties and steam engineering supplies for stationary and marine engines. D. K. Bowls is secretary.

Louis A. Miller, representing Chicago interests, has purchased the good-will, patents, tools, and dies of the Westcott Motor Car Co., Springfield, Ohio. Mr. Miller has leased space in the Westcott plant to maintain a service station.

Address of the American Manganese Steel Co. has been changed from 5805 Downey Road to Box C-1, Huntington Park, Cal.

Officers of the Bantam Ball Bearing Co., Bantam, Conn., state that no change has been made in management, contrary to rumors that the company passed into new hands. Additions to manufacturing equipment have added to capacity and trust bearings of all types are now made to either English or metric dimensions up to 36 in. O. D. The journal roller division manufactures bearings from 1/2 in. I. D. up to 6 in. and larger.

Walter L. McGregor, president and general manager Ideal Fence & Spring Co. of Canada, Ltd., 1025 McDougal Street, Windsor, Ont., announces that the company's spring division, together with the Legget & Platt Spring & Bed Co., Windsor, have been absorbed by the L. A. Young Industries, Inc., Detroit.

Machinery Markets and News of the Works

BUSINESS INCREASING

Gain in Machine Tool Buying Is Moderate but Sources Are Widespread

Automobile Industry Continues to Contribute Large Share of Orders but Other Industries Are Purchasing

IN most sections of the country machine tool buying is showing a steady gain. The automobile industry continues to contribute a large share of current orders, but the general industrial field is yielding more business.

A Cincinnati machine tool builder received an order for 37 special lathes. The Ford Motor Co., Detroit, is

the buyer of about 20 spot welders from a Cincinnati company. In the Pittsburgh district the American Sheet & Tin Plate Co. has bought nine tools.

Interest in shop equipment has been stimulated by two large exhibitions held in the past two weeks at New Haven, Conn., and Cleveland. Not only were many sales made from the floors of the exhibit buildings, but many new prospects were developed.

Railroad buying is in light volume, but inquiry is pending that may be turned into orders soon. No action has been taken by the Lehigh Valley and the Delaware, Lackawanna & Western Railroads on small lists. The Louisville & Nashville and Illinois Central are expected to be buying soon, the former having just issued an inquiry for a carwheel lathe, two journal turning lathes and five engine lathes.

New York

NEW YORK, Sept. 22.

MACHINE tool business is showing a slow but steady improvement both in the volume of orders and inquiries. Those who attended the exhibits of machine tools at New Haven, Conn., and Cleveland brought back not only orders but new prospects which they expect will be turned into orders soon. The Amtorg Trading Co., 165 Broadway, New York, has bought quite a number of tools for shipment to the Russian Soviet Government. Railroad buying has been light in the past week. Neither the Lehigh Valley nor the Delaware, Lackawanna & Western, which recently inquired for machines, has placed orders against its lists. The Brooklyn Manhattan Transit Co. is expected to place orders for substantial lots of equipment for its De Kalb Avenue and Coney Island repair shop, but its buying may be delayed for a month or two.

Wilson-Brown, Inc., machine tool sales representative, 2 Rector Street, New York, has been appointed New York district agent for the R. K. Le Blond Machine Tool Co., Cincinnati, lathe manufacturer. The line has been handled for many years by the Niles-Bement-Pond Co.

The Miso Mfg. Co., 453-55 New Brunswick Avenue, Perth Amboy, N. J., recently incorporated to manufacture oil gages and metal specialties, is in the market for metal stampings, screw machine products, thin-gage steel tubing, strip steel, brass castings, and 1/2-in. pipe plugs. A. Shapiro is manager.

Bids will be received by the New York State Bridge and Tunnel Commission and the New Jersey Interstate Bridge and Tunnel Commission, 3004 Woolworth Building, New York, until Oct. 6 for 18 horizontal centrifugal, motor-driven pumping units, and one triplex drainage pump, complete with motors, controls, etc.; also four horizontal centrifugal booster pumps, with accessories, units to range in capacity from 100 to 1000 gal. per min., with total heads up to 200 ft., for the Holland Tunnel under the Hudson River.

F. Radle, 609 West Thirty-sixth Street, New York, manufacturer of pianos, will soon ask bids for the rebuilding of his five-story factory, 110 x 125 ft., recently partially destroyed by fire. It is estimated to cost about \$100,000 with equipment.

The American Power & Light Co., 71 Broadway, New York, operating electric utilities in Minnesota, Nebraska, Oregon and other states, is disposing of a bond issue of \$5,000,000, a portion of the fund to be used for expansion and improvements.

Murry Shyer, 4 Throop Avenue, Brooklyn, operating an automobile repair works, is reported to be in the market for a crane, about 2-ton capacity.

Edward F. Lenke, 377 Pine Street, Brooklyn, has plans for a one-story and basement factory, 100 x 125 ft., for the manufacture of paper boxes and containers, to cost \$45,000 with machinery. William Wiegand, 17 West Forty-second Street, New York, is architect.

The Vacuum Oil Co., 61 Broadway, New York, has awarded a general contract to the White Construction Co., 1015 Chestnut Street, Philadelphia, for a three-story storage and distributing plant, including barreling works for export service, at Paulsboro, N. J., estimated to cost \$100,000 with equipment.

The John Polachek Bronze & Iron Co., 480 Hancock Street, Long Island City, has awarded a general contract to the James Conforti Construction Co., 47 West Forty-second Street, New York, for extensions and improvements to cost approximately \$55,000.

A group of machine shops, forge shops and general car repair buildings will be constructed by the Board of Transportation, Municipal Building, New York, John H. Delaney, chairman, in connection with its proposed terminal at 208th to 216th Street and the Harlem River, for the municipal subway system. The shops will be designed to serve the equipment and rolling stock of the entire new subway lines. The project will cost in excess of \$3,000,000.

T. Goldstone, 29 Graham Avenue, Brooklyn, architect, is preparing plans for a four-story industrial plant, 90 x 192 ft., to cost about \$200,000, name of owner and occupant temporarily withheld.

The Adirondack Power & Light Corporation, Amsterdam, N. Y., is closing negotiations for the purchase of the plant and system of the North Creek Electric Co., operating at Johnsbury, N. Y., and vicinity, and plans extensions and the installation of additional equipment.

The Manhattan Electrical Supply Co., 17 Park Place, New York, has awarded a general contract to James Mitchell, Inc., Jersey City, N. J., for a six-story and basement plant, 80 x 200 ft., at Pine, Johnson and Monitor Streets, Jersey City, to cost \$175,000. Russell G. Cory, 30 Church Street, New York, is architect and engineer.

Fire, Sept. 11, destroyed the repair shop and other portions of the three-story works of the Hansen Used Car Co., 215 Paterson Street, Paterson, N. J., with loss of \$40,000. Plans for rebuilding are under consideration.

The Board of Education, Long Branch, N. J., is considering the installation of manual training equipment in its proposed new high school to cost \$375,000, for which bids have been asked on a general contract. E. A. Arend, Red Bank, N. J., is architect.

The Walworth Mfg. Co., Boston, manufacturer of valves, fittings, etc., has acquired the Bayonne Supply Co., plumbing supplies, with plant at Avenue E and Fiftieth Street, Bayonne, and will continue operations as a factory branch. The building of the acquired company was destroyed by fire a few months ago and is now in course of reconstruction.

Fire, Sept. 13, destroyed a portion of the Barozzi Drying Machine Co., 616 Clinton Street, Hoboken, N. J., with loss

estimated at \$35,000 including equipment. It is planned to rebuild.

The Board of Education, Scotch Plains, N. J., is considering the installation of manual training equipment in its proposed new high school, to cost \$250,000, for which foundations will be laid at once.

The J. S. Mundy Hoisting Engine Co., 696 Frelinghuysen Avenue, Newark, has taken out a permit for an addition to cost approximately \$26,000.

Officials of the Sloan & Chace Mfg. Co., Ltd., 351 Sixth Avenue, Newark, manufacturer of tools and machinery, have formed a company to be known as Sloan & Chace, Inc., capitalized at \$300,000, to take over and expand the present organization. The incorporators are John Rice, Jr., C. S. Pratt and H. B. Annin.

The Berry Lubricators, Inc., Newark, manufacturer of grease cups and lubricating devices, has leased a portion of the factory at 146 Summit Street for a new plant.

A machine and repair shop for wagon and other repair work will be installed in the three-story building, 75 x 100 ft., to be erected by the Newark Milk & Cream Co., 26 Bridge Street, Newark, estimated to cost \$50,000, for which a general contract has been awarded to the Industrial Engineering Co., 30 Church Street, New York. William E. Lehman, 972 Broad Street, is architect.

The Universal Pipe & Radiator Co., 41 East Forty-second Street, New York, recently secured by new interests, will use about \$3,000,000 in new capital for expansion. The company purposes to develop its heating supply equipment and radiator manufacture and acquire other companies in this line.

D. H. Canfield, 11 Linden Place, Middletown, N. Y., architect, will soon take bids for a three-story automobile service, repair and garage building, 100 x 100 ft., to cost \$90,000 with equipment.

Philadelphia

PHILADELPHIA, Sept. 21.

PLANS have been filed by Ross R. Hipple, Philadelphia, for a one-story machine shop at Girard Avenue and Robinson Street, for which a general contract has been awarded to Getcham & McQuade, 1029 Brown Street.

The Ferro Machine Screw Co., 4317 North Third Street, Philadelphia, has awarded a general contract to Charles J. Erny, Broad and Rockland Streets, for a one-story machine shop.

The Phosphor Bronze Smelting Co., 2200 Washington Avenue, Philadelphia, has awarded contract to the Belmont Iron Works, Twenty-second Street and Washington Avenue, for a one-story addition.

The Packard Motor Co., 318 North Nineteenth Street, Philadelphia, will ask bids soon for a three and four-story and basement factory branch, service and repair building, 200 x 265 ft., to cost upward of \$250,000. P. S. Tyre, 1505 Arch Street, is architect.

The Hamilton Rubber Mfg. Co., Mead and Prince Streets, Trenton, N. J., manufacturer of mechanical rubber products, automobile tires, etc., has acquired the business of the Victor Rubber Co., Springfield, Ohio, manufacturer of tires. It is purposed to remove the machinery to the Trenton works which will be enlarged.

The Joseph Steinhert Machine Works, Mulberry and St. Joes Streets, Trenton, has filed plans for a one-story addition to cost approximately \$25,000, for which foundations will be laid at once.

Harry Zahn and associates have acquired the plant and equipment of the Trent Rubber Co., Enterprise Avenue, Trenton, at a receiver's sale, for \$146,100. The new owners will form a company to operate the plant for the manufacture of automobile tires and tubes and will make improvements.

The Thornton-Fuller Automobile Co. Parkway and Eighteenth Streets, Philadelphia, has awarded a general contract to the William Steele & Sons Co., 219 North Broad Street, for a four-story and basement service, repair and sales building, 300 x 300 ft., to cost \$750,000 with equipment.

Bids are being asked by the Hazzard Mfg. Co., Wilkes-Barre, Pa., manufacturer of wire rope and cable, for its proposed three-story addition, 110 x 190 ft., to cost \$300,000 with machinery. McCormick & French, Second National Bank Building, are architects. J. T. Coyneham is president.

The Board of Education, Huntingdon, Pa., is said to be planning for the installation of manual training equipment in the proposed two-story and basement addition to the high school, to cost \$140,000, for which bids are being asked on a general contract. Hersh & Sholler, Commerce Building, Altoona, Pa., are architects.

Howard M. Bingaman, trustee in bankruptcy for the Harrisburg Foundry & Machine Works, Harrisburg, Pa., has rejected a bid of \$200,000, received at a recent public sale for the property, and has called a new sale on the premises on Sept. 30.

The York Vault Co., York, Pa., recently organized by Charles E. Koch, West York, and associates, is arranging for the establishment of a local plant for the manufacture of reinforced cement burial vaults, from 1500 to 2000 lb. Mr. Koch is chief chemist at the West York mill of the Sandusky Portland Cement Co., and will head the new company.

The Board of Education, Philadelphia, plans the installation of manual training equipment in a proposed three-story and basement high school at Seventeenth and Luzerne Streets, to cost close to \$1,000,000, for which preliminary plans are being drawn by Irwin T. Catherine, architect.

New England

BOSTON, Sept. 21.

MACHINE tool business which earlier in the month gave promise of developing, is still rather remote. Among the few sales reported for the past week, that of a large shear costing upward of \$10,000 to a Massachusetts shop is the outstanding feature. Used equipment sales have been more numerous than new tools, but competition among used machinery houses is very keen. Included in recent inquiries is a shaper for a New England railroad and a sizable boring mill for a Massachusetts shop.

Skilled shop labor in New England is becoming more scarce. Machine tool dealers are beginning to ascribe the inactivity of the market, in part at least, to this condition. They state that New England metal-working users have not awakened to the need of production equipment in the growing scarcity of labor. Various business associations are endeavoring to ascertain where skilled machine shop labor is going and why. One association has figures covering employment of 75 per cent of all Detroit workers. These figures, together with data covering employment in shops coming directly under the supervision of the association, indicate the drift of skilled help is westward. For instance, the number of employees in Detroit, in plants affiliated with this association, during the latter part of November, 1924, was 196,557, or 15,840 less than in 1923. The number working on short time was 107,036, while the average short time week was 40.9 hr. On Aug. 1, last, the number of employees in the same industries was 243,671, an increase of 46,109 as compared with Aug. 1, 1924, and an increase of 47,114 when contrasted with the November, 1924, showing, with no short time. In other Western towns figures show a proportionately large increase in employment.

Bids close Sept. 21 for a two-story, 80 x 231 ft. trade school at Bridgeport, Conn., for which machine tool equipment will be required. E. B. Caldwell, Jr., 886 Main Street, Bridgeport, is the architect.

The American Soda Fountain Co., 262 Congress Street, Boston, is having sketches prepared for a contemplated plant in Watertown, Mass., requiring miscellaneous mechanical and motor equipment. Monks & Johnson, 99 Chauncy Street, Boston, are the engineers.

Bids closed last week on a proposed manufacturing plant for the W. H. Coe Mfg. Co., 74 Weybossett Street, Providence, R. I., for which motors and other equipment are needed. Perry & Whipple, 513 Hospital Trust Building, Providence, are the architects.

The O. F. Kress Co., 102 Concord Street, Lawrence, Mass., will close bids this week on a one-story, 44 x 92 ft. automobile repair shop. Ashton, Huntress & Altar, 477 Essex Street, Lawrence, are the architects.

The American Abrasive Co., Westfield, Mass., will erect a crusher building and storage shed.

The French Mfg. Co., Waterbury, Conn., manufacturer of bronze and copper tubing, will proceed with the erection of a one-story power house to cost \$30,000. W. E. Hunt, Torrington, Conn., is architect.

Fire, Sept. 14, destroyed the wood-turning and handle mill, saw mill and blacksmith shop of Roy Brothers, East Barnet, Vt., with loss reported at \$75,000 including equipment. It is planned to rebuild. John J. Roy heads the company.

The Bureau of Supplies and Accounts, Washington, is asking bids until Sept. 29 for 4500 steel boiler tubes for the Boston Navy Yard; also 16,300 such tubes for the Mare Island yard, schedule 4369.

The Crane Market

THE volume of new business in both locomotive and overhead traveling cranes is small, but pending business includes two sizable lists of overhead cranes as well as a number of single crane inquiries. The locomotive crane inquiry of the Chesapeake & Ohio Railroad, Richmond, Va., calls for two 25-ton locomotive cranes instead of one as reported last week. The list of the Chile Exploration Co., 25 Broadway, New York, calls for prices on three 30-ton, one 100-ton and one 20-ton, electric overhead cranes. The Public Service Production Co., Newark, N. J., is taking bids on a 5-ton, 29-ft. span hand power crane. A 10-ton, 38-ft. span hand power crane previously included is understood to have been postponed until the 1926 appropriation is received. In Colorado, the Stearns, Roger Mfg. Co., Denver, is in the market for a 10-ton, 50-ft. span gantry crane. According to reports, the American Steel & Wire Co. inquiry for a total of 107 small capacity box stripping cranes with electric hoists was divided among three makers, Chisholm & Moore Mfg. Co. taking 38, the Reading Chain & Block Corporation 55, and about 50 of the electric hoists and the remaining cranes going to an Ohio crane builder. Clark Brothers Co., Olean, N. Y., is in the market for a 5-ton electric overhead crane. The Iron City Sanitary Mfg. Co., Zellenople, Pa., which has closed on three cranes this week, will purchase three more in completing the equipment for its new bathtub foundry.

Among recent purchases are:

The Never-Oil Bearing Co., Foundry Street, Wakefield, Mass., has filed plans for a one-story heat-treating building.

The Board of Selectmen, Belmont, Mass., has plans for a one-story automatic power substation, to cost \$150,000 with equipment.

Clarence A. Cowles, Plantsville, Conn., has acquired the former edge tool manufacturing plant of the Peck, Stowe & Wilcox Co., Southington, Conn., comprising a factory building and adjoining land. No announcement has as yet been made by the purchaser regarding operation.

The Bridgeport Aluminum Plate Co., Gold and Housatonic Streets, Bridgeport, Conn., will take bids for a one-story addition, 35 x 65 ft., for which plans have been drawn by Harry Koerner, Bridgeport, architect.

Davis & Byam, Hildreth Building, Lowell, Mass., architects, are preparing plans for a one and two-story automobile service, repair and garage building, 55 x 140 ft., to cost approximately \$45,000 with equipment.

The Bowdoin Square Garage, 13-25 Cambridge Street, Boston, is disposing of a bond issue of \$850,000, the proceeds to be used in connection with a six-story service, repair and garage building at Cambridge and Green Streets with capacity for 820 automobiles, estimated to cost \$884,000 exclusive of site. Construction has begun. J. Murray Howe is president.

Buffalo

BUFFALO, Sept. 21.

IN connection with its new plant on 13-acre tract at Tonawanda, N. Y., the Rice & Adams Corporation, 180 Chandler Street, Buffalo, manufacturer of dairy machinery, etc., plans to remove its present works to the new location and will provide additional equipment to increase the working force from 100 to 300 men. Foundations for the new factory are under way. It is estimated to cost \$200,000 with machinery.

S. J. Fuzak, 1570 Broadway, Buffalo, operating a machine and automobile repair shop, has plans for a one-story addition, 34 x 56 ft., for which bids will be taken at once. N. P. Neiderpreum, 210 Adams Street, is architect.

The Buffalo, Niagara & Eastern Power Corporation, Buffalo, is disposing of a bond issue of \$2,000,000, a portion of the proceeds to be used for extensions and betterments. The company was formed recently by a merger of the Buffalo General Electric Co., Niagara Falls Power Co., Niagara, Lockport & Ontario Power Co. and the Tonawanda Power Co. Charles R. Huntley is chairman of the board.

The Standard Oil Co. of New York, 26 Broadway, New York, has awarded a general contract to Alexander, Shumway & Uts, 80 South Fitzhugh Street, Rochester, for a three-story storage and distributing plant at Rochester, 66 x 100 ft., to cost \$85,000 with equipment.

Property of the Bancroft-Jones Corporation, Buffalo, manufacturer of fabricated steel, bankrupt, consisting of plant and equipment at 11 Hubbard Street, will be offered at a receiver's sale on Oct. 2.

Vermont Marble Co., Proctor, Vt., a 2-ton, 40-ft. span, 2-motor, overhead traveling crane from an unnamed builder.

H. Goldberg, Perth Amboy, N. J., scrap dealer, recently in the market for a 20-ton locomotive crane, has purchased a 20-ton used Browning from Botjer & Sons, Jersey City, N. J.

Bergen Steel & Iron Co., North Bergen, N. J., a 1-ton monorail crane and about 300 ft. of track from the Reading Chain & Block Corporation.

Peracamo Sand Co., New York, a 25-ton locomotive crane from the McMyler-Interstate Co.

Colonial Sand & Stone Co., 643 West Fiftieth Street, New York, a 50-ton locomotive crane from the McMyler-Interstate Co.

Trico Products Co., Buffalo, N. Y., a 5-ton, 3-motor crane from the Northern Engineering Works.

Iron City Sanitary Mfg. Co., Zellenople, Pa., three 5-ton, 42-ft. 8-in. span, mill type cranes from the Morgan Engineering Co.

Duquesne Slag Co., Pittsburgh, a 25-ton, 13-ft. span, special slag ladle crane, from the Milwaukee Electric Crane & Mfg. Co.

Youngstown Foundry & Machine Co., Youngstown, Ohio, a 10-ton, 15-ton and 25-ton overhead crane, all 46-ft. span, from Manning, Maxwell & Moore, Shaw Electric Crane works.

The B. & F. Mfg. Co., 122 Nichols Avenue, Eastwood, N. Y., recently incorporated to manufacture steam carburetors, will rent space for a time and may undertake the construction of a plant later. It is in the market for materials. F. A. Brewer is president.

The Chautauqua County Department of Highways, S. E. Fitch, superintendent, Westfield, N. Y., has plans for a one-story repair shop at Falconer, N. Y., for which a lathe, small drill press and other equipment will be purchased.

The Tidewater Pipe Co., Ltd., Bolivar, N. Y., has acquired 3 acres near Myrtle, Pa., upon which it is planned to erect a pumping station, for which considerable equipment will be required.

Manual training departments will be installed in connection with a new high school to be erected at Oakfield, N. Y., for which the Board of Education has awarded a general contract to the Lowman Construction Co., Elmira, N. Y., at a bid of \$325,000. R. C. Searls is president of the board.

Chicago

CHICAGO, Sept. 21.

PURCHASES of machine tools continue at about the same pace that was set during the first week in September. The bulk of current business is for the lighter tools and comes from well scattered industrial sources, many of which have been dormant for some time so far as machine tool purchases are concerned. While individual orders are not large, they are of sufficient number to create a fair aggregate business. Inquiries are not quite so numerous. Radio parts manufacturers have shown particular interest the past week in light punch presses. Other machine tools which are moving in fair volume are drilling machines, gear hobbors, and milling machines.

Houses selling heavy special purpose railroad and industrial equipment are not faring so well as those dealing more largely in standard types of tools. The Illinois Steel Co.'s list is still pending and the trade looks for some definite action to be taken this week. Transactions in used machinery have been fairly numerous. Interest in used radial drills has been especially active.

The Bradley Badger Engineering Co., 11253 South Michigan Avenue, Chicago, has been incorporated to manufacture clam shell buckets. Officers are: C. J. Bradley, president; W. B. Gregg, vice-president, and Marguerite M. Bradley, secretary.

K. Greaves, 2941 North Mozart Street, Chicago, contemplates erection of a one-story machine shop, 41 x 72 ft., to cost \$9,000. The E. W. Sproul Co., 2001 West Pershing Road, is the general contractor.

The Bowman Dairy Co., 200 West Ontario Street, Chicago, will erect a one-story wagon repair and paint shop, 145 x 149 ft., to cost \$50,000. The general contract was awarded to the Great Lakes Construction Co., 25 East Jackson Boulevard.

The Operative Piano Co., 731 North Kedzie Avenue, Chicago, has awarded a general contract to A. Nelson, 1100 North Central Park Avenue, for a two-story factory, 80 x 98 ft., to cost \$20,000.

F. E. Smith & Co., Chicago, has had plans prepared by William L. Hoffman, Jr., 144 West Forty-seventh Street, for a two-story factory, 43 x 125 ft., at 4044 West Congress Street, to cost \$35,000.

The St. Clair Foundry Corporation, Belvidere, Ill., manufacturer of hot air furnaces, will move its entire plant to Centralia, Ill.

The Chicago Mill & Lumber Co., 111 West Washington Street, Chicago, is considering rebuilding its power house, saw mill and veneer plant at Blytheville, Ark., destroyed by fire Sept. 6. The loss, including machinery, is estimated at \$450,000.

The Central Cold Storage Co., 350 North Dearborn Street, Chicago, will build a five-story and basement cold storage plant, 100 x 126 ft., at 1444-64 South Sangamon Street, to cost \$70,000. D. I. Davis and Associates, 624 South Michigan Avenue, are engineers.

The Hinde & Dauch Paper Co., Fort Madison, Iowa, manufacturer of corrugated paper products, is said to have plans for the early rebuilding of the portion of its mill destroyed by fire Sept. 9, with loss estimated at \$60,000 including equipment. Headquarters are at Sandusky, Ohio.

The Common Council, Onawa, Iowa, will soon begin the erection of an addition to the municipal electric power plant.

C. W. Burdick, Water and Light commissioner, Grand Island, Neb., will soon take bids for pumping equipment and power plant machinery. The Charles L. Pillsbury Co., Capital Bank Building, St. Paul, Minn., is engineer. The installation will cost about \$250,000.

A manual training department will be installed in the three-story high school to be erected at Falls City, Neb., estimated to cost \$250,000, for which foundations will be laid at once. Fiske, Maginnis & Schaumberg, Lincoln, Neb., are architects.

The Wisconsin Steel Works of the International Harvester Co., Torrence Avenue and 106th Street, Chicago, will erect three one-story additions, 120 x 745 ft., 24 x 460 ft. and 100 x 418 ft., estimated to cost \$300,000 with equipment. The first noted structure will be used for the rolling mill division and the others for general operating service. K. S. Baetzman is company architect.

The State Highway Department, 1246 University Avenue, St. Paul, Minn., has plans for a one-story machine shop, 60 x 130 ft., at Hopkins, Minn.

The Standard Oil Co., 910 South Michigan Avenue, Chicago, has plans for a new storage and distributing plant at Peoria, Ill., including power house, pumping station and garage, to cost \$175,000 with equipment. W. Gauger, 36 West Randolph Street, Chicago, is architect.

The General Etching & Mfg. Co., 312 South Hamilton Avenue, Chicago, manufacturer of etched metal products, has acquired property at 3070-82 West Grand Avenue, totaling about 46,000 sq. ft., and has plans under way for a new one-story plant to occupy the entire tract, estimated to cost \$100,000 with equipment. L. E. Russell, 25 North Dearborn Street, is architect. Frederick Lubin is president.

St. Louis

St. Louis, Sept. 21.

THE Standard Semi-Steel Foundry Co., Clinton, Mo., has tentative plans for a new one-story foundry at Springfield, Mo., 65 x 200 ft., to cost about \$50,000. The installation will include a 10-ton and 5-ton electric traveling crane. C. T. Wilks is general manager.

The City Council, Tonkawa, Okla., has engaged the Ruckel Engineering Co., Arkansas City, Kan., to prepare plans for a proposed municipal electric light and power house, to cost \$135,000 with equipment.

The Arkansas-Missouri Power Co., Walnut Ridge, Ark., has tentative plans for rebuilding the portion of its power house destroyed by fire Sept. 7, with loss estimated at \$350,000 including machinery.

The City Council, Henrietta, Okla., contemplates the installation of a pumping plant and other power equipment in connection with a proposed municipal waterworks, for which a bond issue of \$200,000 is being arranged. The Holway Engineering Co., Wright Building, Tulsa, Okla., is engineer.

The International Rubber Co., 120 Broadway, New York, is reported to be planning the construction of a new plant at Poplar Bluff, Mo., for the manufacture of inner tubes, cushion inner tires, etc., to cost \$200,000 with machinery.

The Hamp Williams Automobile Co., Hot Springs, Ark., is said to be arranging for the early rebuilding of its service, repair and garage building recently destroyed by fire, with loss estimated at \$200,000 including equipment.

The Ozark Pipe Line Co., Springfield, Mo., is planning for extensions and improvements in its power house, including the installation of a new steam unit.

The Oklahoma Pipe Line Co., Chickasha, Okla., a subsidiary of the Carter Oil Co., is reported to be considering the construction of a new pipe line in the Carter-Knox oil-fields in Grady County, to cost \$100,000.

The Pennsylvania Petroleum Co., North Kansas City, Mo., has authorized the immediate rebuilding of the portion of its storage and distributing plant and laboratory recently destroyed by fire with loss estimated at \$125,000 including equipment.

The Common Council, Red Ford, Okla., is planning to call for bids for pumping equipment and accessory apparatus for a proposed municipal waterworks, to cost \$65,000. The Holway Engineering Co., Wright Building, Tulsa, Okla., is engineer.

Cincinnati

CINCINNATI, Sept. 21.

A SHARP increase in sales stimulated the local machine tool market the past week. Automobile makers were the leading source of business, while railroads bought more freely than for several months. The general industrial field is yielding a fair number of orders which are chiefly confined to single machines. The outstanding feature of the week was the receipt of an order by a local builder for 37 special lathes. The Ford Motor Co. is the buyer of approximately 20 spot welders from a Cincinnati manufacturer. The Southern Railway purchased two 18-in. lathes locally and the Canadian National Railways closed for two standard 30-in. lathes. A tube maker bought four special lathes in this market, while the United States Government ordered an extension gap lathe for shipment to Seattle, Wash.

The Niles-Bement-Pond Co. sold a combination journal turning and axle lathe to the St. Louis & San Francisco Railroad. It is reported that the Louisville & Nashville Railroad is inquiring for a carwheel lathe, two journal turning lathes and five engine lathes. It is understood that the Illinois Central will transfer much of its old equipment to its new shops at Paducah, Ky., but will nevertheless be in the market for a considerable amount of machinery. This carrier, whose purchase of four lathes from a local builder was reported a week ago, also purchased at the same time an engine lathe from a Cincinnati company and four lathes from a St. Louis builder.

Planer manufacturers state that business has improved slightly. The Cincinnati Planer Co. booked an order from the Mansfield Trade School, Mansfield, Ohio, for a 24-in. planer. Shaper makers are busy, some of the business coming from tool and die shops as well as from schools. One manufacturer declares that September has already proved to be one of the best months of the year. Production of automatic lathes is proceeding at a steady pace with a considerable portion of the orders coming from automobile makers. The John Steptoe Co. sold a 16-in. lathe for shipment to Mexico. The Link-Belt Co., Indianapolis, purchased two gear-cutters from a local machinery dealer. Operations of plants manufacturing milling machines and grinders have been heavy. Upright and radial drill companies state that sales have held up fairly well this month. Orders for single machines have been received by a local turret lathe manufacturer. Although foreign business has fallen off somewhat, scattered sales have been made to European countries.

The outlook is promising for steady production throughout the fall. Local builders have been figuring on a large number of inquiries, many of which are expected to develop into sales in the next month.

The Big Four Railroad will take bids until Oct. 1 on steel locomotive and car axles and on steel billets for its fourth quarter requirements. The tonnage is unstated.

The Flash Fire Extinguisher Co., Dayton, Ohio, has been incorporated to manufacture a new type of fire extinguisher. Production will be started within a few days at 228 North St. Clair Street. W. M. Klinger is president and general manager.

The Economy Rubber Products Co., 650 South Main Street, Dayton, Ohio, has acquired the floor space formerly occupied by the foundry of the Davis Sewing Machine Co. The Economy company manufactures tire accessories and will expend approximately \$25,000 in remodeling the new plant. Harry and Jacob Dubin are the owners.

The Duro Pump & Mfg. Co., Dayton, Ohio, is reported to be adding to its equipment to increase production. Machinery is now being purchased.

The Board of Education, Ashville, Ohio, is considering the installation of manual training equipment in its proposed two-story high school, to cost \$100,000. F. F. Glass, 186 East Broad Street, Columbus, Ohio, is architect.

The Randle Machinery Co., 1723 Powers Street, Cincinnati, has inquiries out for several engine-generator sets of 100-, 125-, 150- and 200-kw. capacity, engine units of automatic type, direct-connected to generators.

The City Council, Defiance, Ohio, has authorized a bond issue of \$425,000 for a municipal electric light and power plant.

Fire, Sept. 10, destroyed a portion of the plant of the Kentucky Cash Register Co., Louisville, with loss estimated at \$60,000 including equipment. It is planned to rebuild.

The Dempster Equipment Co., Dempster Building, Knoxville, Tenn., machinery dealer, has inquiries out for a steam-driven air compressor, about 510-cu. ft. per min. capacity, Sullivan type.

The Campbell-Dana Hardwood Co., Tullahoma, Tenn., is said to be planning for the early rebuilding of the portion of its mill destroyed by fire Sept. 7, with loss estimated at \$400,000 including machinery.

The Carolina, Clinchfield & Ohio Railway Co., Johnson City, Tenn., has plans for enlargements and improvements in its car repair and locomotive shops at Erwin, Tenn., comprising an extension to the engine house, machine shop, paint shops, coaling station and other structures, to cost \$275,000. This work is in addition to a general expansion program in progress, to cost approximately \$500,000.

The Board of Education, Cincinnati, is considering the installation of manual training equipment in its proposed three story and basement Western Hills high school on the Ferguson Road, to cost \$700,000, for which bids will soon be asked on a general contract. Garber & Woodward, Union Central Building, are architects.

Fire, Sept. 15, destroyed a portion of the oil storage and distributing plant of the Knox Oil Co., Mount Vernon, Ohio, with loss reported at \$75,000 including equipment. Plans for rebuilding are being considered.

The hydraulic Press Mfg. Co., Mount Gilead, Ohio, is said to be planning the early rebuilding of its one-story foundry, recently destroyed by fire with loss of about \$20,000 including equipment. Howard McMillan is one of the heads of the company.

The Commissioner of Public Utilities, Jackson, Tenn., J. G. Neudorfer, will receive bids until Oct. 15 for electric light and power equipment for the municipal waterworks and other service.

Pittsburgh

PITTSBURGH, Sept. 21.

MACHINE tool business generally is still running chiefly to single tools, but total sales are fairly satisfactory. A report that builders are advancing delivery dates because they are well filled up is not believed by the local trade to be true, except of those manufacturers producing special adaptations of standard machines. Deliveries of standard tools are prompt in this vicinity. The American Sheet & Tin Plate Co. has placed about nine tools the past week. The Youngstown Sheet & Tube Co. has bought two complete pipe threading machines for Youngstown.

Bids will soon be asked by the Manchester Auto & Machine Co., 1216 Liverpool Street, Pittsburgh, for its two-story and basement machine shop, service and garage building, 60 x 140 ft., to cost \$250,000 with equipment. A. M. Bowman, Bessemer Building, is architect.

The Allegheny River Sand Corporation, Pittsburgh, has applied for permission to construct a sand and gravel loading plant on the Allegheny River, Washington Township, consisting of hoists, bins, loading machinery, ice breakers, etc.

James W. Arrott, Ltd., Arrott Building, Pittsburgh, has plans for rebuilding the portion of its power house on Barkers Way, recently destroyed by fire with loss estimated at \$35,000 including equipment.

The Central Pipe & Supply Co., P. O. Box 1099, Charleston, W. Va., is in the market for a quantity of coal-mining machinery, including hoists, cars, etc.

The Hardy Coal Co., Fairmont, W. Va., is planning for the installation of additional machinery in the Thacker district, including hoisting and loading apparatus, electric power equipment, etc. A note issue of \$750,000 is being sold, a portion of the fund to be used for the expansion. Headquarters are at 85 Exchange Street, Portland, Me.

Robert R. Gray, Union District High School, Union, W. Va., is interested in the purchase of a number of small sized commercial refrigerating plants, and is desirous of securing data and cost.

The Board of Education, Leetsdale, Pa., is considering the installation of manual training equipment in its proposed two-story and basement high school estimated to cost \$170,000, for which bids have been asked on a general contract. John H. Phillips, P. O. Box 977, Pittsburgh, is architect.

Superstructure work has begun on three additions at the plant of the Bessemer Gas Engine Co., Grove City, Pa., one of which will be equipped as a foundry. The expansion will cost upward of \$75,000. Frank D. Chase, Inc., Chicago, is architect and engineer.

The West Virginia Brick Co., Charleston, W. Va., is in the market for electrical power equipment, transmission, conveying and hoisting machinery, to replace that recently destroyed by fire.

Detroit

DETROIT, Sept. 21.

ARRANGEMENTS have been made by the Romeo Foundry & Machine Co., Romeo, Mich., recently organized with a capital of \$75,000, for a lease of the local plant of the Holmes Foundry Co., idle for a number of months. Improvements will be made and additional equipment installed. H. D. Rumsey is president, and Charles E. Brinker, vice-president and general manager.

Bids will be received by the Board of Water Commissioners, 176 East Jefferson Avenue, Detroit, until Oct. 13 for two motor-driven centrifugal pumping units, one with capacity of 70,000,000 gal. per day, and the other, 50,000,000 gal. daily, complete with accessories. George H. Fenkell is general manager.

The Ford Motor Co., Detroit, has asked bids on general contract for a three-story addition, 68 x 800 ft., at its Lincoln motor plant, Warren and Livernois Avenues, to cost \$600,000 with equipment. Albert Kahn, Marquette Building, is architect.

The Michigan Gas & Electric Co., Ishpeming, Mich., is considering the construction of a new power plant at Marquette, Mich., to cost close to \$100,000 with transmission lines.

Manual training equipment will be installed in the new junior high school to be erected at Birmingham, Mich., to cost \$250,000, for which bids have been asked on general contract. Frederick D. Madison, Royal Oak, Mich., is architect.

The Chevrolet Motor Co., Bay City, Mich., a division of the General Motors Corporation, has established a branch for the production of carburetors for Chevrolet cars, with an initial production schedule of 200 per day, which will be increased before the close of the year. The working force in the department will be enlarged by about 75 to 100 men.

The Hotto Engineering Co., 515 Lyncaste Avenue, Detroit, M. C. Hotto, president, has awarded a general contract to the Austin Co. for a one-story machine shop, 60 x 140 ft., to cost \$30,000.

The Anderson Machine Co., Iron Mountain, Mich., has plans for a one-story addition to its machine shop, 60 x 65 ft.

The Royal Oak Tool & Machine Co., Royal Oak, Mich., has tentative plans for an addition for which work is expected to begin early in the coming year. It is proposed to double the present capacity.

The Detroit Motor Bus Co., 14401 Dexter Boulevard, Detroit, has awarded contract to the Austin Co. for a one-story service, repair and garage terminal, 135 x 300 ft., at Springwells, Mich., to cost \$155,000 with equipment. W. F. Evans is president.

Smith, Hinchman & Grylls, Marquette Building, Detroit, architects, have plans for a one and two-story industrial building, 180 x 185 ft., at Mount Elliott Avenue and North Heintz Street, for which the owner's name is temporarily withheld. It will cost in excess of \$100,000.

Cleveland

CLEVELAND, Sept. 21.

INTEREST of machine tool manufacturers and dealers was centered the past week in the unusually large and fine exhibit held in this city in connection with the annual meeting of the American Society for Steel Treating. The machine tool part of this exhibit not only attracted great interest, but resulted in an unusually large volume of sales, particularly in the new types of machines. Much of the machinery displayed was sold and many good prospects developed. Manufacturers of industrial furnaces and other lines of equipment shown at the exhibition also report a good volume of sales.

The Lang Body Co., 2088 West 106th Street, Cleveland, has taken bids for a one-story addition, 80 x 182 ft., to cost \$45,000. C. E. Lang is president and Elmer J. Lang, vice-president and general manager.

The Reliance Steel & Construction Co., Warren, Ohio, has awarded contract to the Warren Engineering Co. for a factory, 50 x 140 ft. C. R. Gilbert is general manager.

The F. E. Myers & Brothers Co., Ashland, Ohio, manufacturer of pumps, has placed contract with George Kratt & Sons, 1054 Ninth Street, Lorain, Ohio, for a five-story factory, 70 x 180 ft.

The Willard Storage Battery Co., 246 East 131st Street, Cleveland, has placed contract with the A. A. Lane Construction Co. for alterations to its machine shop.

The W. S. Tyler Co., 3650 Superior Avenue, Cleveland, manufacturer of ornamental iron and bronze work, has awarded contract to the Sam W. Emerson Co. for a 38 x 40 ft. addition to its foundry. The George E. Ryder Co., Century Building, is the architect.

F. E. Schumacher, Hartville, Ohio, will erect a factory for the manufacture of fly screens. Charles E. Firestone and Lowell Christman, Renkert Building, Canton, are the architects.

The Safe Cabinet Co., Marietta, Ohio, has completed plans for a four-story factory, 80 x 700 ft., and will take bids shortly. E. W. Hopp is general manager.

The Butler Paper Products Co., Toledo, Ohio, contemplates the erection of a two-story and basement factory, 50 x 100 ft. C. E. Butler is president. Mills-Rhines-Bellman & Nordhoff, 1234 Ohio Building, are the architects.

Indiana

INDIANAPOLIS, Sept. 21.

BIDS will soon be asked by the Board of County Commissioners, Court House, Princeton, Ind., for equipment for two pumping plants, including four 300-hp. oil engines, pumping units, two 3-ton cranes and other apparatus, estimated to cost \$35,000. Harry E. Morrison, Court House, is county engineer.

The Remy Electric Co., Anderson, Ind., manufacturer of automobile ignition equipment, a division of the General Motors Corporation, Detroit, has taken over a portion of the plant of the parent company at Muncie, Ind., for a new branch factory. It is purposed to have the works ready for service in about 60 days. A. B. Gomory, formerly connected with the Anderson plant, has been appointed superintendent.

The Indian Refining Co., Lawrenceville, Ill., refined oils, is arranging for a new storage and distributing plant on East New York Street, Indianapolis, to include a machine shop, automobile service and garage building and paint shop, to cost approximately \$85,000. George R. Bryant is chief engineer.

Plans have been filed by the Terre Haute, Indianapolis & Eastern Traction Co., Tribune Building, Terre Haute, Ind., for its proposed repair shops and car barns, one and two stories, 50 x 250 ft., including machine shops, wood-working shop and paint shop, to cost \$250,000 with equipment. The Shourds-Stoner Co., Tribune Building, is architect.

The Northern Indiana Gas & Electric Co., Hammond, Ind., has applied for permission to issue preferred stock in an amount of \$1,000,000, the proceeds to be used for extensions and improvements in plants and system, including work now in progress.

The M. P. Dahl Tool & Die Co., Indianapolis, has leased property at 106 West Twelfth Street for a new plant.

Manual training equipment will be installed in the two-story and basement high and grade school to be erected by the Washington Township Board of Education, Marion, Ind., to cost \$100,000, for which bids will soon be asked on a

general contract. Thomas R. McGraw, Citizens' Bank Building, Kokomo, Ind., is architect.

The Board of Education, 150 North Meridian Street, Indianapolis, will install a manual training department in its proposed three-story and basement West Side high school, for which bids are being asked on general contract until Oct. 2. Vonnegut, Bohn & Mueller, Indiana Trust Building, are architects.

The Vogelsong Lighting Co., Indianapolis, manufacturer of lighting fixtures, has leased property at 233½ East Maryland Street for a new shop.

South Atlantic States

BALTIMORE, Sept. 21.

THE plant and property of the Detrick & Harvey Works of the Bethlehem Steel Corporation, at Baltimore, have been acquired by local interests, headed by J. W. Neidhardt, heretofore in charge of production under the Bethlehem management. A new company is being organized to take over the property, to be known as the Detrick & Harvey Machine Co., capitalized at \$375,000, and 10,000 shares of stock, no par value. Plans are under consideration for enlargements. The plant was taken over by the Bethlehem company in 1915 and used for the manufacture of munitions. Mr. Neidhardt will be president and manager of the new corporation.

The Baltimore Spring Bed Co., 754 West Pratt Street, Baltimore, has awarded contract to the Consolidated Engineering Co., local, for a one-story addition.

The Columbus Electric & Power Co., Broad Street, Columbus, Ga., will issue preferred stock in amount of \$2,321,000 and common stock for \$1,750,000, the proceeds to be used for its proposed hydroelectric power development on the Chattahoochee River, near Bartlett's Ferry, Ga.; construction of a steel tower transmission line to Macon, Ga., and for other expansion.

The Old Dominion Distillers' Corporation, National Bank of Commerce Building, Norfolk, Va., is said to have tentative plans for the construction of a new plant on a 10-acre tract, recently acquired, for the manufacture of industrial alcohol and kindred products. A power house and machine shop will be built. The entire project is reported to cost \$400,000. Thomas H. Wilcox is president.

T. J. Pratt, 315 Bank of Commerce Building, Norfolk, Va., machinery dealer, has inquiries out for an electric magnet, with 7½-kw. turbo-generator, for use in connection with a locomotive crane.

The Common Council, Warrenton, Va., is planning the installation of pumping machinery in connection with a proposed municipal waterworks, for which a bond issue has been approved. G. H. Massey, Norfolk, Va., is engineer.

R. P. Johnson, Wytheville, Va., machinery dealer, has inquiries out for belt-driven well-drilling machines, complete with a string of tools for 6-in. diameter holes, 500 ft. deep.

The Norfolk & Western Railway Co., Clyde Cocke, purchasing agent, Roanoke, Va., is asking bids until Sept. 30 for couplers and parts, contract serial No. AA-370; wire fencing, contract serial No. AA-371; locomotive steel tire, contract serial No. AA-372; steel springs, contract serial No. AA-373, and wrought steel pipe, contract serial No. AA-374, all for the period from Oct. 1 to Dec. 31.

The Town Council, West Hickory (P. O. Hickory), N. C., plans the installation of pumping equipment in connection with a proposed municipal waterworks to cost \$50,000, in which amount bonds have been voted.

The purchasing agent, Post Office Department, Washington, is asking bids until Sept. 30 for 14 brake band riveters and for 14 bench drill presses.

J. M. Wiggins, head of the Wiggins Motor Co., Greensboro, N. C., and associates have acquired the plant and equipment of the McGlamery Automobile Co. Plans are under way for a reorganization of the company and the operation of the works for the manufacture of parts, assembling, etc.

The Sparrow Lumber Co., Florence, S. C., will erect a new plant, including planing mill, saw mill, power house and miscellaneous structures, to be equipped for a capacity of 50,000 ft. per day. The plant will specialize in the production of staves, cooperage materials, etc. H. G. Sparrow is head.

The Hackley Morrison Co., 1708 Lewis Street, Richmond, Va., machinery dealer, has inquiries out for a feed water heater; one waste heat blower, 8 to 12 in. diameter, and a number of industrial motors, from 5 to 75-hp. capacity, 220 volts, three-phase, 60-cycle.

The Armour Fertilizer Works, Inc., Chicago, has acquired the plant and property of the Fisheries Products Corporation, Norfolk, Va., bankrupt, for \$100,000 and will take

possession in 60 days. Plans are being arranged for a new branch works at this location, with improvements in present buildings and the installation of additional machinery.

The Southern Power Co., Charlotte, N. C., is completing plans for a new steam-operated electric generating station on the Catawba River, near Charlotte, for emergency service. It will have an initial capacity of 80,000 hp. and is reported to cost \$500,000.

Fire, Sept. 14, destroyed a portion of the mill of the Collton Cypress Co., Walterboro, S. C., with loss estimated at \$200,000 with equipment. Plans are under way for rebuilding.

The W. H. Anderson Co., Greensboro, N. C., is arranging for a two-story cold storage and refrigerating plant, 100 x 150 ft., to cost \$200,000 with machinery. The installation will include a 4-ton electric elevator, spiral chutes, overhead trolley system and other apparatus.

The Board of Education, Baltimore, plans the installation of manual training equipment in the proposed Southern junior high school, near public school No. 7, estimated to cost \$700,000, for which foundations will be laid at once.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until Sept. 29 for lathes, benches and tools for watch-making and other precision work at various yards, schedule 4362.

P. J. Derieux, Tappahannock, Va., is planning to purchase a quantity of machinery for the manufacture of matches.

Gulf States

BIRMINGHAM, Sept. 21.

TENTATIVE plans are being considered by the Tampa Shipbuilding & Engineering Co., Tampa, Fla., for rebuilding the portion of its steel fabricating plant recently destroyed by fire, with loss estimated at \$350,000 including equipment.

The City Commission, Arlington, Tex., has authorized the construction of a municipal electric light and power plant to cost \$89,500, for which bonds have been approved.

The J. O. Heinze Cultivating Tractor Corporation, Bessemer Trust & Savings Bank Building, Bessemer, Ala., manufacturer of motor-driven farm equipment, is said to have preliminary plans for a new unit in the vicinity of Selma, Ala., to cost approximately \$125,000 with machinery.

The Ford Motor Co., Highland Park, Detroit, has acquired property adjoining its assembling plant at Jacksonville, Fla., and has tentative plans for a new unit to double the present capacity.

Fire, Sept. 11, destroyed a portion of the storage and distributing plant of the Magnolia Petroleum Co., Electra, Tex., with loss reported at \$100,000 including equipment. Headquarters are at Dallas, Tex.

The Guadalupe Water Power Co., Houston, Tex., E. P. Wilmot, president, is said to have plans under way for the construction of a hydroelectric power plant on the Guadalupe River, near Seguin, Tex., to be carried out in conjunction with the proposed hydroelectric power project of the Comal Power Co., New Braunfels, Tex., in this district, to cost \$500,000.

W. M. Smith & Co., First Avenue, Birmingham, machinery dealers, have inquiries out for dump cars, 1½-yd. capacity, 24-in. gage; also for a number of motors, 25, 50, 75 and 100 hp., 550 volts, a. c., and for a clam shell bucket, about 1½-yd. capacity.

The United States Engineer, Florence, Ala., is asking bids until Oct. 10 for an air pressure pipe system for the navigation lock of the Wilson dam.

The United North & South Oil Co., Inc., Luling, Tex., has authorized the complete electrification of its properties on both sides of the San Marcos River in the Luling oil fields, and will install machinery to replace all present gas engines and auxiliary equipment. The company will soon decide whether to construct a generating plant or to use central station service, with local automatic power substation, and in the former event will soon purchase steam-operated electric generating machinery. The entire project will cost \$150,000.

The Morgan Companies, Shreveport, La., S. R. Morgan, president, will build a new ice-manufacturing plant to cost \$175,000 with machinery, the majority of which will be electrically-operated.

The City Commission, Vemaa, Fla., will proceed with the construction of a municipal electric light and power house and municipal ice-manufacturing plant, for which plans have been completed.

The Pierce Oil Corporation, Fort Worth, Tex., has tentative plans for extensions and betterments in its refinery,

inactive for a number of months. It is purposed to install cracking units for gasoline production and new refinery equipment.

The Hodes-Zink Mfg. Co., Fremont, Ohio, manufacturer of automobile equipment, is considering the establishment of a factory branch at Miami, Fla.

The Tampa Electric Co., Tampa and Cass Streets, Tampa, Fla., will install additional equipment at its local steam-operated electric generating plant, including two 665-hp. boilers, pumps and accessories.

The Leshner & Rockett Co., Fort Worth, Tex., is considering rebuilding the portion of its planing mill destroyed by fire Sept. 6, with loss estimated at \$17,000 including equipment.

The Milldale Ice Co., 1010 East Bay Street, Jacksonville, Fla., is arranging for a one-story addition to its ice-manufacturing plant, to cost \$150,000 including equipment. S. S. Simmons is manager.

The Nocatee Crate Co., Nocatee, Fla., has authorized rebuilding the portion of its plant recently destroyed by fire, consisting of a one-story structure, 135' x 260 ft. It will cost close to \$90,000, of which approximately \$65,000 will be used for machinery purposes. H. T. Davis is secretary.

The City Commission, Bushnell, Fla., is asking bids until Oct. 14 for pumping machinery and accessory equipment for a proposed municipal waterworks. E. V. Camp & Associates, Peninsular Building, are engineers.

J. M. Garrett, Montgomery, Ala., city engineer, is asking bids until Oct. 20 for one motor-driven centrifugal pump with capacity of 6,000,000 gal. per day, to operate under 110 lb. maximum pressure, complete with motor, controls and accessory apparatus.

The Central Texas Power Co., Childress, Tex., is contemplating the erection of a new ice-manufacturing plant to cost approximately \$100,000 with equipment. Frank Houston is general manager.

Milwaukee

MILWAUKEE, Sept. 21.

AUTOMOTIVE industries are again relatively active buyers of shop equipment, particularly for production floors, and while there is a scattering demand from several other lines, the automotive trade is furnishing the bulk of the business. Electrical manufacturers are taking some tools, the radio industry being especially active. The larger shops are doing some replacement work, but otherwise are not interested in new buying, apparently having adequate capacity. The outlook for fall and winter is considered more promising than a year ago, with demands upon foundries and machine shops growing.

The Common Council, Menasha, Wis., has rejected bids opened Sept. 1 for a 600- to 1000-hp. Diesel oil engine and a 500-kw. generator set for the city water and light plant, and is asking for new bids to be opened Oct. 6. The improvement, including a power house addition, will cost about \$75,000. J. F. DeCaro is city clerk.

The Wisconsin Butter Tub Co., 234 West Ninth Street, Marshfield, Wis., has plans by G. A. Krasin, local architect, for a two-story addition, 55 x 140 ft., and will take bids for erection about Sept. 24. With new machinery, motors, etc., the work will cost about \$35,000. Paul Blum is general manager.

The Seeger Sheet Metal & Furnace Co., Milwaukee, has been incorporated with \$10,000 capital stock and will establish a general sheet metal-working shop. The principals are Fred C. Seeger, 763 Fifty-second Street; L. A. Erhart and Frank O'Connor, who will be the active manager. Equipment will soon be purchased.

The Board of Industrial Education, Oshkosh, Wis., has accepted the bid of \$256,720 entered by the C. R. Meyer & Sons Co., local contractor, for erecting the new vocational school and recreational building, designed by Auler & Jensen, local architects, and estimated to cost \$350,000 complete. R. K. Schriber is president of the board.

The Board of Education, Cudahy, Wis., will close bids Sept. 29 for the erection of a new high school, three stories, 60 x 200 and 60 x 100 ft., designed by Rosman & Wierdsma, architects, 490 Broadway, Milwaukee. The cost is estimated at \$225,000, this being the first unit of a \$500,000 school building program. William F. Rasche is president of the board.

The Jenkins Machine Co., Sheboygan, Wis., recently mentioned as having acquired the plant of the defunct Falls

Machine Co. at Sheboygan Falls, states that it is no longer interested or connected in any way with the manufacture of automobile bumpers and stampings.

Canada

TORONTO, Sept. 21.

MACHINE tool sales have improved the past two or three weeks. The present demand is chiefly for labor and time-saving tools, and inquiries call for the latest equipment. There is, however, a good movement in second-hand and rebuilt tools. Certain classes of electrical equipment are active and a number of good contracts have been awarded recently on new works account. Mining interests in northern Ontario are preparing for extensive construction campaigns and there is a possibility of a big demand for this class of equipment. The automotive industry is still the principal buyer of machine tools.

The town of Merritt, Ont., is contemplating construction of a filtration plant, including the installation of a new pumping unit. E. H. Darling is consulting engineer.

The Quebec Power Co., Quebec, has taken over property in Limoulin where it proposes to build a repair shop at a cost of \$400,000.

The Noranda Mines, Amos, Que., will build a smelter with a capacity of 500 tons a day.

The ratepayers of Sillery, Que., will raise \$35,000 to carry out additional work in connection with a waterworks plant. J. A. Gauthier is mayor.

The Village Council, Forest Hill, Ont., approved plans submitted by James, Proctor & Redfern, consulting engineers, Toronto, Ont., for a sewage system and disposal plant to cost \$300,000.

J. J. Macnab, Trenton, Ont., has the general contract for the construction of power plant at Campbellford, Ont., for the Quinte & Trent Power Co.

The Cobalt Contact Co., North Cobalt, Ont., will start work in the course of the next week or two on a plant to have a daily capacity of 50 tons.

The Vipond Consolidate Co., Timmins, Ont., proposes to increase the capacity of its mill from 160 tons to 400 tons per day. J. M. Bell is managing director.

The blacksmith shop of the Canadian National Railways at Moncton, N. B., was destroyed by fire with loss of \$10,000.

The building occupied by Miller Motors and the Montreal Foundry Co., Montreal, was destroyed by fire with loss to building and equipment of \$50,000.

The St. John Iron Works, St. John, N. B., was damaged by fire with a loss of \$15,000.

Western Canada

The ratepayers of Camrose, Alta., have carried a by-law in favor of installing additional equipment in the municipal power plant. J. D. Saunders is secretary-treasurer.

The factory of the Minneapolis Threshing Machine Co., Calgary, Alta., was damaged by fire with a loss of \$25,000.

Pacific Coast

SAN FRANCISCO, Sept. 16.

PLANs are being prepared for a group of three one-story buildings at Berkeley, Cal., by the Solano Iron Works, Third and Allston Streets, estimated to cost \$27,000.

The Board of Education, Los Angeles, has plans for a one and two-story manual arts building at the John C. Fremont high school, to be 60 x 160 ft. The work will be carried out in connection with other buildings, the entire program to cost \$300,000. Edwin Bergstrom, Citizen's National Bank Building, is architect.

The Southern California Edison Co., Los Angeles, has authorized the construction of a steel tower transmission line to connect its Big Creek and San Joaquin hydroelectric generating plants, with extension to Los Angeles, totaling 230 miles, estimated to cost \$10,000,000.

The Austin Western Road Machinery Co., 435 Brannan Street, San Francisco, will make extensions and improvements in its one-story plant, to cost \$17,000.

The Pacific Spring Co., Fruitvale, Cal., has awarded a general contract to R. W. Littlefield, 354 Hobart Street, Oakland, Cal., for its proposed two-story plant, to cost \$50,000. James W. Plachek, 2014 Shattuck Avenue, Berkeley, Cal., is architect.

The Portland Artificial Ice Co., 336 Eighteenth Street, North, has taken out a permit for an addition, 32 x 75 ft.

The City Council, Prosser, Wash., will soon ask bids for pumping machinery in connection with a proposed municipal waterworks, for which an appropriation of \$125,000 is available. Barr & Cunningham, Spalding Building, Portland, Ore., are engineers.

The Board of Water and Power Commissioners, 207 South Broadway, Los Angeles, is asking bids until Oct. 6 for one steam turbo-electric generator for a proposed emergency power plant, specification P-361; also for three boilers and accessories, specification P-362.

The General Electric Co., Los Angeles and Schenectady, N. Y., has awarded a general contract to the Austin Co. for a three-story storage and distributing plant at Santa Fe Avenue and Fifty-second Street, 80 x 240 ft., with office adjoining, estimated to cost \$1,000,000 with equipment. A traveling crane will be installed.

The Union Ice Co., Escondido, Cal., will erect a one-story ice-manufacturing plant adjoining its local cold storage building, to cost \$35,000.

The Puget Sound Sawmill & Shingle Co., Bellingham, Wash., is arranging to rebuild its plant destroyed by fire several months ago. Additional equipment will be installed. The work is estimated to cost \$75,000. J. G. Earle is vice-president.

The Northwestern Ice & Cold Storage Co., Portland, has plans for a two-story addition to its ice-manufacturing plant, 84 x 200 ft., to cost \$35,000. F. L. Davis, Portland, is architect.

H. E. Jaynes, Bakersfield, Cal., will build a new one-story plant at West Twenty-third Street and Chester Avenue, for the manufacture of automobile bodies, fenders and kindred sheet metal products.

L. L. Warren and Robert Baird, Jr., Porterville, Cal., have broken ground for a one-story plant for the manufacture of pumping equipment and parts, and for electrical repair work.

The Goodyear Tire & Rubber Co. of California has authorized construction of a plant addition at Los Angeles to cost \$1,000,000. Completion of the extension will make available a total of 1,000,000 sq. ft. of floor space.

The Utah Oil Refining Co., Salt Lake City, Utah, is planning the reconstruction of a power house in connection with the rebuilding of a refinery destroyed by fire Sept. 5 with a loss estimated at \$750,000.

Work has started on the construction of two brick additions to the plant of the Public Service Brass Co., 721 East Slauson Street, Huntington Park, Cal.

Foreign

THE Town Council, Queenstown, Cape Province, South Africa, is planning the construction of a new municipal electric power plant, with installation to include two 250-kw. generators, steam-driven, and auxiliary machinery, to cost close to \$140,000.

Guggenheim Brothers, 120 Broadway, New York, metals, have purchased tin properties in Bolivia, and plan the early installation of a dredging plant with auxiliary works. The project includes the construction of a hydroelectric generating station.

The Department of Public Works, Rome, Italy, has authorized an appropriation of close to \$1,000,000, to be used during the coming fiscal year for the electrification of a portion of the line of the Bolzano-Brenner Railroad, including additional hydroelectric power development for operating service.

The Longhill Foundry, Ltd., West Hartlepool, England, is desirous of getting in touch with American manufacturers of sandblast equipment, chilled shot, refractories, stone-working tools, etc.

The Braden Copper Co., Rancagua, Chile, vicinity of Santiago, is said to be contemplating the early rebuilding of the portion of its plant destroyed by fire Sept. 13, with loss estimated at close to \$225,000 including equipment. New York headquarters of the company are at 120 Broadway.

The Monitor Controller Co., Baltimore, manufacturer of automatic motor starter and control apparatus, and Edgewood resistors, has established a branch office in the Evening Star Building, Eleventh Street and Pennsylvania Avenue, Washington. C. R. Speaker is in charge, with territory embracing the District of Columbia, Virginia and southern West Virginia.

The Cleveland Duplex Machinery Co., Cleveland, will represent the American Broach & Machine Co., Ann Arbor, Mich., in Cleveland and surrounding counties.

Current Metal Prices

On Small Lots, Delivered from Stocks, New York

THESE prices are given for the convenience of small-lot buyers whose requirements do not run into mill-size orders.

Only base prices can be listed in some cases, due to limits of space; other items of a given group are deducible from the base price.

The prices which are quoted below are those at which small lots may be bought, whether from jobbers' or other stocks.

Complete market reports and prices on large shipments from mills will be found elsewhere under "Iron and Steel Markets" and "Non-Ferrous Metals."

Bars, Shapes and Plates		Per Lb.
Bars:		
Refined iron bars, base price.....	3.24c.	
Swedish charcoal iron bars, base.....	7.00c. to 7.25c.	
Soft steel bars, base price.....	3.24c.	
Hoops, base price.....	4.49c.	
Bands, base price.....	3.99c.	
Beams and channels, angles and tees, 3 in. x ¼ in. and larger, base.....	3.34c.	
Channels, angles and tees under 3 in. x ¼ in. base.....	3.24c.	
Steel plates, ¼ in. and heavier.....	3.34c.	

Merchant Steel		Per Lb.
Tire, 1½ x ½ in. and larger.....	3.30c.	
(Smooth finish, 1 to 2½ x ¼ in. and larger)...	3.65c.	
Toe-calk, ½ x ¾ in. and larger.....	4.20c.	
Cold-rolled strip, soft and quarter hard.....	7.00c.	
Open-hearth spring steel.....	4.50c. to 7.00c.	
Shafting and Screw Stock:		
Rounds and hex.....	4.00c.	
Squares and flats.....	4.50c.	
Standard tool steel, base price.....	15.00c.	
Extra tool steel.....	18.00c.	
Special tool steel.....	23.00c.	
High-speed steel, 18 per cent tungsten.....	70c.	

Sheets		Per Lb.
Blue Annealed		
No. 10.....	3.89c.	
No. 12.....	3.94c.	
No. 14.....	3.99c.	
No. 16.....	4.09c.	

Box Annealed—Black		Per Lb.
Soft Steel		
C. R. One Pass	Blued Stove	
Per Lb.	Pipe Sheet	
Nos. 18 to 20.....	3.70c. to 3.95c.	.....
Nos. 22 and 24.....	3.75c. to 4.20c.	4.35c.
No. 26.....	3.80c. to 4.25c.	4.40c.
No. 28*.....	3.90c. to 4.35c.	4.50c.
No. 30.....	4.10c. to 4.55c.	.....

Galvanized		Per Lb.
No. 14.....	4.00c. to 4.35c.	
No. 16.....	4.15c. to 4.50c.	
Nos. 18 and 20.....	4.30c. to 4.65c.	
Nos. 22 and 24.....	4.45c. to 4.80c.	
No. 26.....	4.50c. to 4.95c.	
No. 28*.....	4.90c. to 5.25c.	
No. 30.....	5.40c. to 5.75c.	

*No. 28 lighter, 36 in. wide, 20c. higher per 100 lb.

Standard Steel		Wrought Iron	
Black Galv.		Black Galv.	
½ in. Butt....	46 29	½ in. Butt....	4 +19
¾ in. Butt....	51 37	¾ in. Butt....	11 + 9
1-3 in. Butt....	53 39	1-1½ in. Butt....	14 + 6
2½-6 in. Lap..	48 35	2-in. Lap....	5 +14
7 & 8 in. Lap..	44 17	3-6 in. Lap....	11 + 6
11 & 12 in. Lap.	37 12	7-12 in. Lap....	3 -16

Bolts and Screws	
Machine bolts, cut thread, 40 and 10 per cent off list	
Carriage bolts, cut thread, 30 and 10 per cent off list	
Coach screws, 40 and 10 per cent off list	
Wood screws, flat head iron,	
80, 20, 10 and 5 per cent off list	

Steel Wire		Per Lb.
BASE PRICE† ON NO. 9 GAGE AND COARSER		
Bright, basic.....	4.25c.	
Annealed, soft.....	4.50c.	
Galvanized, annealed.....	5.15c.	
Coppered, basic.....	5.15c.	
Tinned, soft Bessemer.....	6.15c.	

†Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire	
BASE PRICE	
High brass sheet.....	19½c. to 20½c.
High brass wire.....	19½c. to 20½c.
Brass rods.....	16½c. to 17½c.
Brass tube, brazed.....	27½c. to 28½c.
Brass tube, seamless.....	23½c. to 24½c.
Copper tube, seamless.....	24½c. to 25½c.

Copper Sheets	
Sheet copper, hot rolled, 21½c. to 22½c. per lb. base.	
Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.	

Tin Plates		Coke—14x20		Prime Seconds	
Bright Tin					
Grade "AAA"	Grade "A"	80 lb...	\$6.15	\$5.90	
Charcoal 14x20	Charcoal 14x20	90 lb...	6.30	6.05	
IC...\$11.25	\$8.85	100 lb...	6.45	6.20	
IX... 12.85	10.85	IC...	6.65	6.40	
IXX... 14.40	12.55	IX...	7.85	7.60	
IXXX... 15.75	13.85	IXX...	9.00	8.75	
IXXXX... 17.00	15.05	IXXXX...	10.35	10.10	
			11.35	11.10	

Terne Plates	
8 lb. coating, 14 x 20	
100 lb.....	\$7.00 to \$8.00
IC.....	7.25 to 8.25
IX.....	8.25 to 8.75
Fire-door stock.....	9.00 to 10.00

Tin	
Straits, pig.....	60c.
Bar.....	65c. to 67c.
Copper	
Lake ingot.....	16½c.
Electrolytic.....	16½c.
Casting.....	16 c.

Spelter and Sheet Zinc	
Western spelter.....	9¼c.
Sheet zinc, No. 9 base, casks.....	12½c. open 13c.

Lead and Solder*	
American pig lead.....	10½c. to 12½c.
Bar lead.....	12½c. to 13½c.
Solder, ½ and ½ guaranteed.....	40c.
No. 1 solder.....	37c.
Refined solder.....	30½c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal	
Best grade, per lb.....	75c. to 90c.
Commercial grade, per lb.....	35c. to 50c.
Grade D, per lb.....	25c. to 35c.

Antimony	
Asiatic.....	20c. to 21c.

Aluminum	
No. 1 aluminum (guaranteed over 99 per cent pure), ingots for remelting, per lb....	31c. to 34c.

Old Metals	
Business is quiet and prices are practically unchanged. Dealers' buying prices are as follows:	

	Cents Per Lb.
Copper, heavy crucible.....	12.00
Copper, heavy wire.....	11.75
Copper, light bottoms.....	9.50
Brass, heavy.....	7.25
Brass, light.....	6.00
Heavy machine composition.....	9.00
No. 1 yellow brass turnings.....	8.50
No. 1 red brass or composition turnings.....	8.25
Lead, heavy.....	8.00
Lead, tea.....	6.50
Zinc.....	4.50
Cast aluminum.....	18.00
Sheet aluminum.....	18.00

